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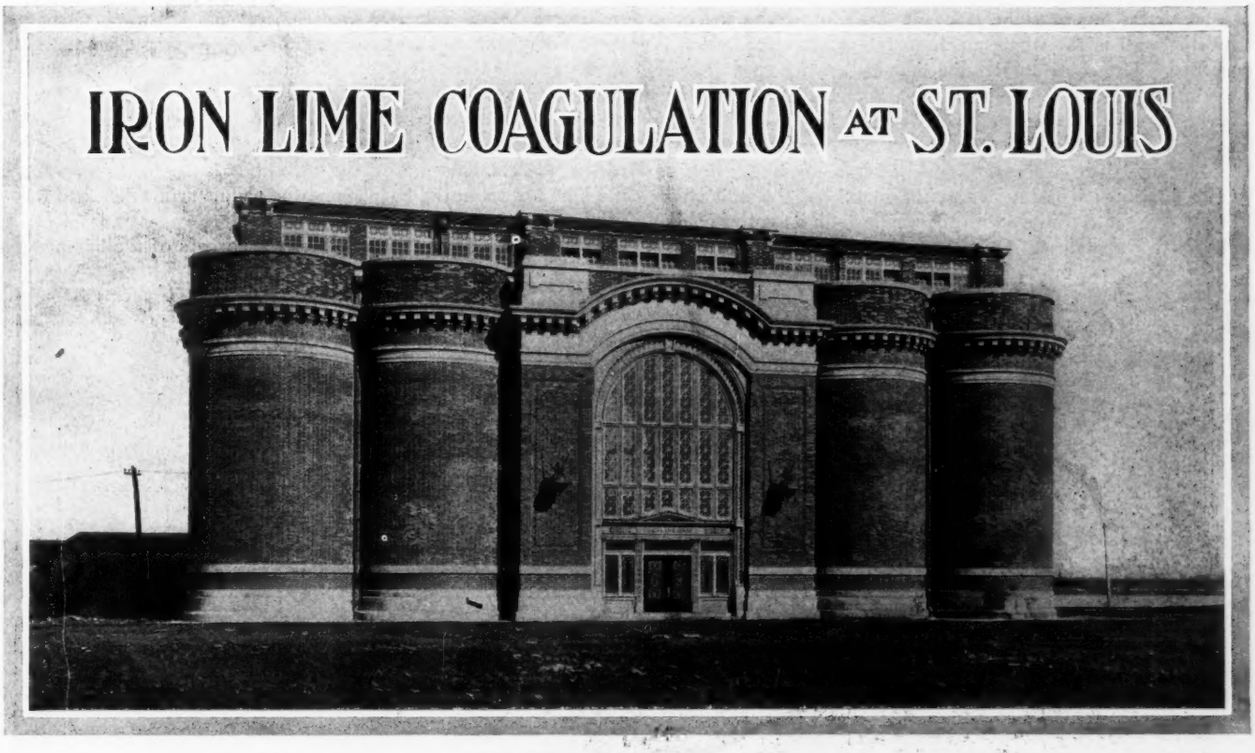
IRON LIME COAGULATION AT ST. LOUIS



VIEW OF COAGULATION HOUSE

By CHAS. CLAUDE CASEY

THE St. Louis Water Department has installed what is probably the most nearly automatic coagulant house in the world. Two men operate the plant, or, rather, two men take care of the plant while it operates itself. The plant has now been operating six months without a hitch. It was designed to continue permanently the lime-iron coagulant system adopted temporarily by St. Louis just prior to the World's Fair, when that city, by the narrowest of margins, was saved from making a world-wide reputation for muddy water.

St. Louis almost fifty years ago was the first American city to study water clarification methods, and recently it has been the first large city to try the lime-iron coagulant. Although at the time St. Louis adopted this process it was being tried by Quincy, Ill., in a small way in connection with filtration, this could not have been considered an adoption of the process as it is now employed, for it would have cost the city many times its present outlay to have used the system as Quincy was using it.

With an average daily consumption of approximately 80,000,000 gallons, and a muddy river to draw its supply from, the coagulation of the water supply of St. Louis is an important matter. The original iron-lime plant was a frame building costing all told about $10,000, but it required the services of fifteen to twenty men to operate it, with the number growing with every increase in the water consumption. The new plant, dispensing with all but six of the men—three shifts of two men each—saves more than $10,000 a year in wages alone, not including the waste of material occasioned by uneven mixing of the coagulants by the original plant.

With the new plant in operation, Assistant Water Commissioner Edward E. Wall estimates the expense of clarifying the city's water supply at $4.60 per million gallons, a low rate as compared with some other cities. That was the cost last year, but the estimate for this year includes the salaries of two experts employed to work out improvements on the new plant, which will offset savings effected by the new plant. The lime used last year aggregated 14,000 tons, costing $4.54 delivered, or a total of $63,560. Iron cost $10 a ton, and 4,500 tons were used, bringing the total cost to $45,000. This is a total of $108,560 for materials. Cleaning sediment out of the settling basins cost $1,702.32, or less than one cent per million gallons, while electric current, labor, oils, etc., connected with the coagulant house cost a total of $15,869.28, or about 29 cents per million gallons. The cost on some of the items this year

will be less, but two experts have taken the place of the twelve or fifteen laborers, and are being paid good salaries out of the fund for betterments. The difference between their salaries and the wages paid the fifteen men will allow about 7 per cent for interest on the investment in the new plant and still get the clarification at the old price.

Settlings from the muddy river water aggregated 114,256 cubic yards last year from the 25,242 million gallons of water which was pumped. There was a total depth of sediment in Basin No. 1, from which most of the settlings were removed, of 80.3 inches. Three other basins had 12.16, 18.0 and 27.96 inches, respectively.

The following description of the plant and its operation is given by Mr. Edward E. Wall, Assistant Water Commissioner, who was one of the engineers employed in designing and constructing the plant:

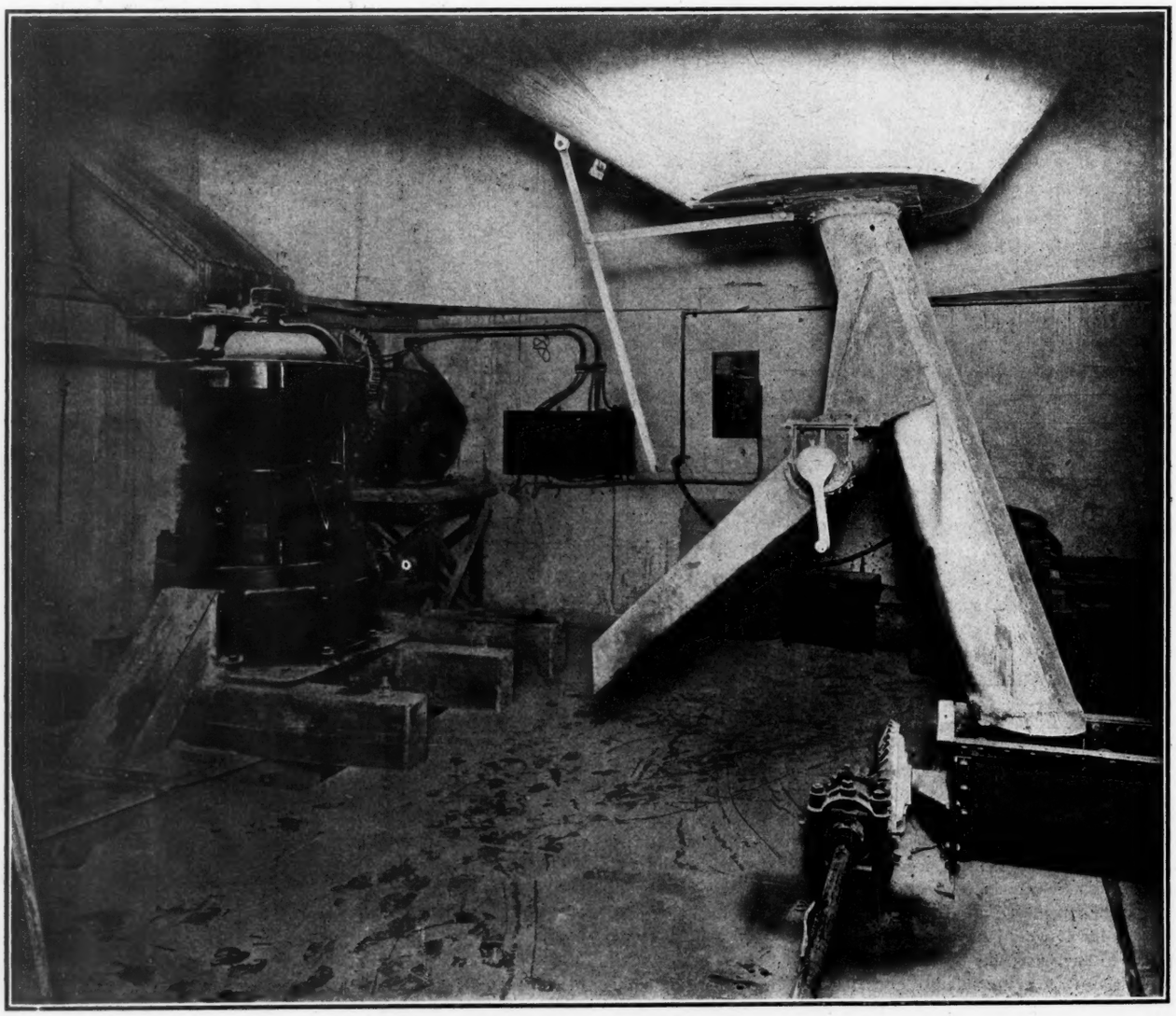
Lime is unloaded from box cars into a chute at the corner, or corners, of the building, the labor of unloading being the only labor employed in the whole plant, so far as actual operation is concerned. The chute carries the lime by gravity to a crusher in the basement, one being placed at each corner of the building. From the crusher, where the lime is ground to one-half inch or smaller, it goes downward through another covered chute to a belt conveyor. The conveyor is enclosed in a box-like casing, so that the lime in its passage from the mouth of the first chute does not come into contact with the air through its entire course to the water supply.

The belt conveyor takes the lime to the centre of the building, where it is dumped onto an elevator conveyor and taken upward to the top of the building and poured into the top of the lime storage bins. These are four in number, and are 20 feet in diameter by 59 feet high. There are four similar bins for iron. Each of the conveyors is about 24 inches wide, and the boxed-up casings are about one by two feet. The belts are kept dished by running on concave rollers, and the elevators are of the bucket type.

From the storage bins the lime flows by gravity through a chute at the bottom of each onto another belt conveyor, which carries it to another elevator. This raises it from the basement back to the top of the building and dumps it into the top of the daily supply hoppers. These hoppers contain about 10 tons, and are refilled automatically.

It was originally planned to put the two hoppers, one for lime and one for iron, on springs, so that the depression in the springs caused by the weight of the full hoppers would cut off the current and stop the filling motors, which would be started again when the released springs should raise the hoppers sufficient to bring the wires in contact. This plan was abandoned in favor of interior paddles, which are arranged to accomplish the same purpose. As each hopper fills, its paddle is pushed out of the vertical, shutting off the current, to cut it in again when the lime lowers in the hopper and the paddle swings back to the vertical.

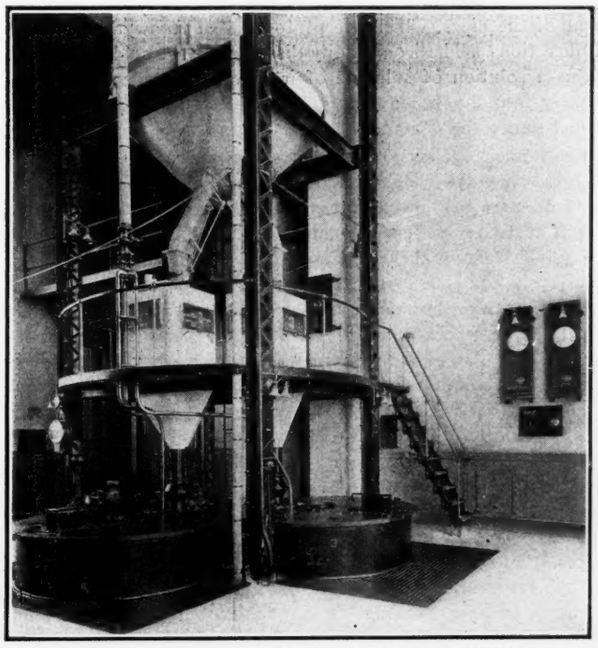
The crushing apparatus in one of the corners of the basement



LIME CRUSHER, STORAGE BIN, CHUTES AND BELT CONVEYORS

At left, chute from outside building, crusher and top of belt conveyor box: at top, bottom of lime storage bin; at right, chute from bin to belt conveyor, and electric controlling apparatus

is shown in the cut, together with the bottom of one of the storage bins. A part of the covered belt conveyor is shown, leading to the left from the crusher in the photograph, as is also the chute leading from the outside of the building down into the crusher, and the chute and belt conveyor leading down and away from the lower end of the storage bin. With the exception of the crusher, this construction is about the same as that of the iron chutes and conveyors. The opening in the wall through which the chute passes, which is just above the ground level outside of the building, is closed with a tight iron door when not in use, but may be seen at the right of the photograph of the exterior of the building by a close examination. There is a track along both the front and back of the building.



LIME SLAKING MACHINERY
Showing bottom of daily supply hopper, automatic scales, slaking tanks and regulating clocks

The photograph of the lime-slaking machinery shows the lower part of one of the daily supply hoppers, carried by four heavy beams. Underneath the hopper are three scales connected to the hopper by three separate chutes, and below the scales are three tanks in which the lime is slaked. On the right are shown two clocks, in duplicate, which regulate the action of the scales. All of the equipment is in duplicate except the scales and slaking tanks, which are in triplicate.

From the daily supply hopper the lime is fed into the scales by gravity. The apparatus is set for a complete operation every one, two or four minutes as desired, and if it is necessary at any time to operate more than one scale, each can be operated for separate lengths of time, as one at two-minute intervals and the other at one-minute intervals, or one at four and the other at one or two. When the hands of the clock reach the point indicating a movement of the machinery current is cut in, starting a motor, which operates the necessary slides to dump the lime which has been weighed in the scale, and to allow another batch to flow by gravity from the hopper into the weighing apparatus. When the lime in the scale has reached the weight for which the apparatus is regulated the scale beam tips and the flow of lime is automatically cut off. The scale then holds its load until the clock reaches another point of action.

When the lime is released from the scale it flows downward into the slaking tank, where it is met by a quantity of water equal in weight to three and one-half times the lime. This water has previously been heated to a temperature of 120 degrees Fahrenheit, and when it reaches the lime there is an immediate chemical action. The lime would not slake in cold water quickly enough to allow of any rapidity of operation in the plant, but with hot water the slaking is accomplished very quickly. It is so quick, in fact, that the resultant milk of lime is ready to leave the slaking tank by the time the next load of lime is ready to be dumped into the tank.

Another point in the automatic ingenuity of the scales is the variation in the amount of lime that can be handled. Each scale has a variation in load from 40 to 100 pounds at each weighing, and, with the variation in time, each scale can handle any desired amount from 600 to 6,000 pounds per hour, and the three scales increase the possible variation from 600 to 18,000 pounds per hour. From this it will be seen that the maximum capacity of the plant, though not the working capacity, is several times the capacity of the pumping machinery controlling the water supply.

As the milk of lime flows continuously from the slaking tank it passes through another tank just below the floor, called the heater tank. The slaking of the lime raises the temperature of the contents of the slaking tanks to 200 degrees, and this is used to heat water for additional slaking. Coils of copper pipe have been placed in the heater tank, and during the time that the milk of lime is in this tank a sufficient quantity of water to slake another batch of lime, going upward through these coils of copper pipe, is heated to 120 degrees. The heat-generating device is a near-perpetual-motion apparatus, the hot water helping to slake the lime and heat the milk of lime, and the latter heating the water. Since the water can enter the slaking tank only when the automatic mechanism acts upon the valves, it is seen that there is always a standing supply of water in the copper coils to be heated, and there is always a tank full of milk of lime in contact with the coils.

When the solution has performed its work of heating the water it passes into another tank, shown in the photograph as

WATER HEATING TANK, IN CENTER; COOLER BOX, AT LEFT

the cooling box. In this box additional water, direct from the pressure mains, mixes with the milk of lime. The latter enters the box at a temperature of about 140 degrees, and the water cools the diluted solution to about 100 degrees, and the whole is then pumped from the box to the delivery well in a continuous stream by centrifugal pumps. Both the lime water and the general water supply from the river, which has already passed through the pumps and is now being forced to the settling basins, empty into the delivery well, and are thoroughly mixed as they pass into the large conduit leading from the well to the first basin. The well is about 1,000 feet from the coagulant house, and the lime solution is introduced into the water at the outlet from the well to the conduit, thus insuring even mixing. The velocity of the water through the conduit is so great as to

prevent any sedimentation. The purpose of holding out the lime until the water has passed through the pumps is to prevent coagulation too soon, for when the lime and the iron meet in the water coagulation immediately begins.

The quantity of lime is regulated by the amount and condition of the water supply taken up from the river. This part is not automatic. It is necessary for the foreman of the plant to set the regulators for the amount of lime and iron required. It is a very simple task, however, and since that and the oiling and cleaning of the machinery is all the foreman and his assistants have to do, the two employes of the plant have no very hard work.

About 90 per cent of the mud and impurities in the water settle to the bottom in the first basin into which the supply empties. The water in the second of the six basins is clearer with the new process than the sixth basin had been under the old clarification system formerly used.

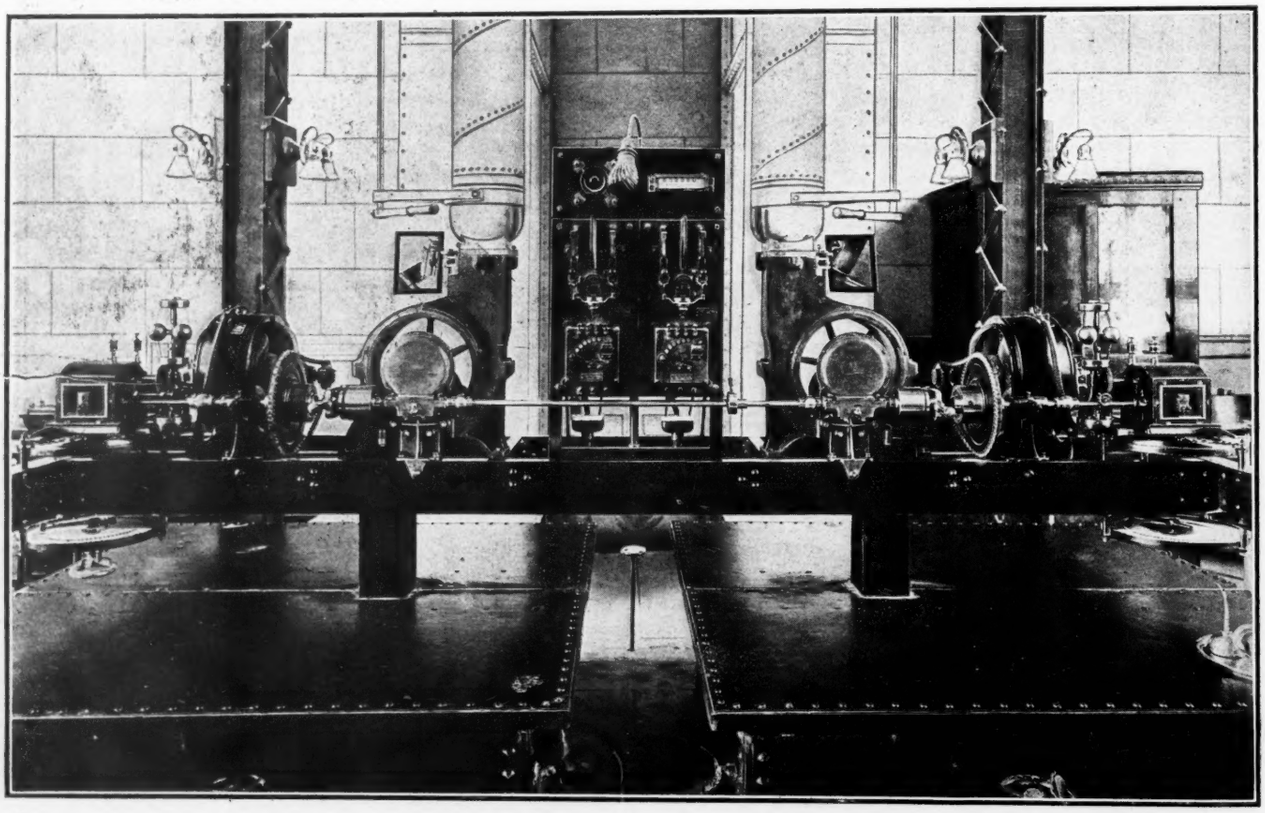
Up until the time it is emptied into the daily supply hopper the course of the iron and the operation of the machinery for its delivery are exactly the same, barring the crusher. From the daily supply hopper to the water supply the iron takes a separate course and is handled by a different kind of machinery.

From the hopper there are but two supply tubes, the equipment being in duplicate. These tubes are shown in the photograph of the iron mixing machinery, the picture showing only the machinery below the supply hopper. On the outer sides of the supply chutes, to the right and left of the switchboard, will be seen two mirrors. These mirrors reflect the flow of iron from the chute to the upper flat surface of a revolving wheel underneath the mirror. These wheels take the place of the weighing apparatus in the lime machinery (the iron and lime machinery, as shown in the photographs, face each other), and act to make the flow continuous into the mixing tanks below. The wheel of each duplicate machine revolves at 300 revolutions per hour, regardless of the amount of material being supplied, and acts only to equalize the flow. Much difficulty was encountered in making this wheel revolve regularly, on account of the wide irregularity of the electric current. The revolutions were finally regulated, however, by a new speed regulator invented by A. I. Jacobs, Engineer in Charge of the supply and purification division. This is shown at the extreme left and right of the photograph of the iron-mixing machinery, and operates on the principle of changing the amount of resistance in the field coils of the motor driving the machinery. It reduces the 20 per cent variation in the electric current to less than one-half of one per cent on the shaft. By actual register count the revolutions of the shaft vary from 1,500 to 1,506 per hour, and the speed of the wheel, which turns once in every five revolutions of the shaft, consequently varies but one and one-fifth revolutions per hour, or 1.2 in 300.

In the tank the iron is mixed with water from the pressure mains, distributed over the bottom of the tank by the arrangement of the pipes, which are perforated to throw the water in all directions. The iron readily dissolves in the cold water, and forms a solution of sulphate of iron, which is allowed to flow directly into the water supply as it passes through the intake tunnel under the coagulant house.

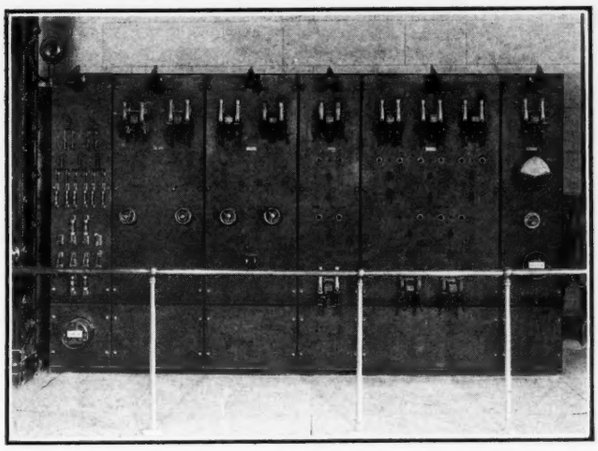
The tunnel extends 1,000 feet out into the river, and is about 45 feet below the ground surface at the inshore and about the same distance below the bottom of the river outside the bank. It was bored for the entire 1,700 feet (1,000 feet under the river and 700 feet from the river bank to the pump house) through solid rock, and lined with brick to form a seven-foot conduit, with dry packing between the brick and the rock. Immediately under the coagulant house the tunnel rises from its level under the river to that of the inshore tunnel, which is 25 feet higher, and the iron solution flows down directly into this uptake tunnel.

The cost of the plant was about $125,000, including building and machinery. Much of the cost was due to the special designing and making of machinery, all of the machinery and equipment used being entirely novel. Part of it was manufactured in the machine shops of the Water Department, and the remainder was assembled in the shops from parts manufactured in other places. While the interest and depreciation on the investment for the large modern plant will amount to a considerable sum annually, the initial saving of about $10,000 in wages alone, and



IRON MIXING MACHINERY

Showing distributing wheel, automatic speed regulators and mixing tanks; all in duplicate



SWITCH BOARD

Light for each motor indicates whether it is running or not. Red indicates operating; green, not operating

the probable saving in lime and iron used by insuring a more uniform supply, are expected to overbalance the increased expense.

As might be expected with such complicated machinery, some parts of the plant were found to need modifications, and experts are kept there most of the time now, designing and carrying out improvements. Their services will be required for several months, and they will remain as long as the changes and improvements which they can make continue to pay their salaries by reducing the operating cost.

The scales, which were built by a scale manufacturer from a list of requirements given him by the designers of the plant, offered one serious drawback. The use of hot water so near the outlet from the scales allowed steam to penetrate to the interior of the mechanism and cause a partial slaking of the lime within the apparatus. Half a dozen methods were tried to keep the lime from clogging up the machines, but they were only partially successful. A sheet of cooler water is now kept flowing across the bottom of the scale chute to condense the steam before it can enter the scale, and this is found to solve the problem.

Another device that is being designed is a machine for taking samples of lime from the belt conveyor at five-minute intervals. Samples are now being taken from the cars by workmen and run through a separate crusher, but by the new device the engineers hope to save the expense of taking samples and of separate crushing and provide an automatic collection of samples that will give continuous information concerning the contents of each car. This is desirable, since lime is bought according to chemical analysis, and if it does not come up to the standards a reduction is made in the price.

The belt conveyor system and bucket elevators have been found unsatisfactory for lime on account of the dusty character of the material. Dust of lime continually falls or settles under the belt, so that it is necessary at frequent intervals to clean out the casing. It is proposed to replace the belt with a scraper conveyor, the trough through which the lime passes being continuously scraped on the bottom, which is expected to prevent the collection of dust. In the elevators the trouble has been encountered in a different way. Lime is so light that it does not make the dump as the buckets turn over at the top of the bucket chute, and much of it falls back into the chute. The conveyor and elevators were both designed for grain and similar heavy products, and while perfect in action, do not meet the requirements for the material used. It was taken for granted that elevator and conveyor manufacturers would be able to meet the requirements, but they had no precedents to follow. It has not yet been decided what plan will be adopted to relieve the condition in the elevators, but the engineers employed by the department expect to solve the problem sooner or later.

Another difficulty has been encountered which, while not serious, is giving some trouble. It is the sticking of the sulphate of iron in the storage bins. This trouble is caused by the damp condition of the material, causing it, as it dries, to become lumpy. It is hoped to solve this trouble by requiring the manufacturers to dry the material better, and by the use of compressed air apparatus arranged within the bins for breaking loose any material that sticks to the sides or fails to go through the chutes. A crusher will be installed between the daily supply hopper and the outlet chutes in the iron distributing machinery, to break up any lumps encountered. This apparatus will be placed on both the regular and duplicate machines.

Because of the very newness of the system, many other defects or opportunities for improvements have developed. The plant has been in operation since May, however, and has never been shut down for a minute, day or night, so it will be seen that, while subject to improvement, the present plant is not a failure by any means.

AN OBJECTIONABLE MANHOLE HEAD

AT its best a manhole head and cover are an undesirable feature of city streets. When placed in macadam or dirt streets the surface is almost sure to be worn down around them by the jarring of wheels or the sliding of these around the edge of the head, thus scraping out the dirt and stone. This can be avoided in most cases by placing cobble stones around the head for a distance of two or three feet therefrom, but the cobble stones themselves are objectionable on a smooth macadam road. On brick or stone streets the necessity of breaking bricks at more or less acute angles to fit them around the head weakens them and is apt to cause rapid wear for a few inches around the head. Asphalt pavements also are found to wear down or crack away from manhole heads. It is therefore desirable to reduce the number of these to the least practicable, and to make every effort to so design them as to make them as little objectionable as possible. The location of the manhole may frequently be made so as to minimize the objectionable features. For instance, this is certainly one argument in favor of locating under the sidewalk, rather than under the roadway, sewers and other conduits requiring manholes or other forms of access.

In the majority of cities the manhole head used is of the type which seems to be accepted as the best yet devised, a perfectly flat head with square or round projections on the cover for offering foothold to horses. We have, however, seen in a number of cities a head and cover for which the term "mushroom" seems appropriate, in which the object appears to be to offer so much obstruction as to keep teams off of it altogether. One of these is shown in the accompanying photograph. The head of this is 32 inches across. The cover is 20 inches in diameter and rises 3 inches above the level surface of the head. This cover is about 4 inches thick, projecting down somewhat inside of the head to prevent its sliding off and being practically flat on the bottom. The object here was certainly not to afford as little obstruction as possible to traffic, and it would be interesting to learn the designer's reason for adopting this form. A considerable number of these are still in use in several of the Southern cities, even on smooth pavements in some cases.

"MUSHROOM" MANHOLE COVER

DEPTH OF WATER PIPE

Customary Depth and Effect of Same Upon Freezing — Data from Eighty-Seven Cities Collected by New England Water Works Association — Circulation Prevents Freezing — Ice in Standpipes

A COMMITTEE of the New England Water Works Association has during the past year been collecting what information it could concerning the depth at which water pipes, both mains and laterals, should be laid in order to avoid freezing. Their report has just been presented, and is given herewith, practically complete except for the tabulation of the replies. The report is as follows:

Three hundred and twenty circulars (appendix) have been sent out, to which ninety replies have been received. The information required by the circular was of two classes, the first comprehending general data in regard to local conditions and practice in laying water pipe, and the second covering the results of particular experiences in freezing.

Concisely it may be stated that the result of the investigation made by your committee is largely negative in character—that is to say, it appears that freezing has not occurred at the depths generally adopted for laying water pipe. Whether these depths are excessive, however, cannot be predicted from the information at hand, because where freezing has occurred there has always been an obvious explanation, usually little or no velocity, and an analysis of these explanations and of the local conditions pertaining does not finally justify any general deduction as to necessary depths.

Considering the results of our investigation in greater detail, reference may be made to the appended table which summarizes the replies received to the questions of the circular. While these replies do not provide the information necessary for conclusions of much practical value, it is believed that there is sufficient information contained therein to make their publication worth while. There is little doubt that if a more general response to the circular had been obtained something of real value might have been worked out and it may be that the presentation of the data now collected will provide a basis for future work and stimulate further study of the problem.

From the tabulations of these it is apparent, as already stated, that in general the depths now used are sufficient to prevent freezing, but it is less evident whether or not these depths could safely be reduced. Either it must be concluded that present standards express the results of a gradually developed experience and that the present depths are the least which would be safe, or else there is a possibility of lessening these depths without danger. This conclusion is indicated from the fact that with practical unanimity all replies state that the present depths are sufficient, and a considerable number suggest that lesser depths might safely be used. Whenever freezing has occurred it has been largely at night or where there was practically no current, and it is believed that where there is a velocity, say, in excess of one-quarter of a foot per second, and particularly in the case of ground water supplies, depths somewhat less than those now used would generally be safe. In main feeders, and in those portions of the distribution system where there will be an assured circulation, the question of minimum depths should be given careful consideration. It is not in the mains but in the services that most of the trouble from freezing occurs, and in the services such trouble usually results from skimping by plumbers or contractors, resulting in the actual laying of the services at depths considerably less than the mains. There is a strong feeling apparent that services should be laid by the municipalities.

Twenty-eight of the places replying report the tapping of service connections on the top of the main, 39 on the side, 12 on the quarter, and 7 in various ways. Freezing of services generally starts at the house and backs out into the main, and it is believed that if services were tapped on the side of the main and then dropped to the depth required to meet local conditions, the lessening of the depth at which the main is laid to that justified by the velocity of the water in the main will not result in increased freezing of services.

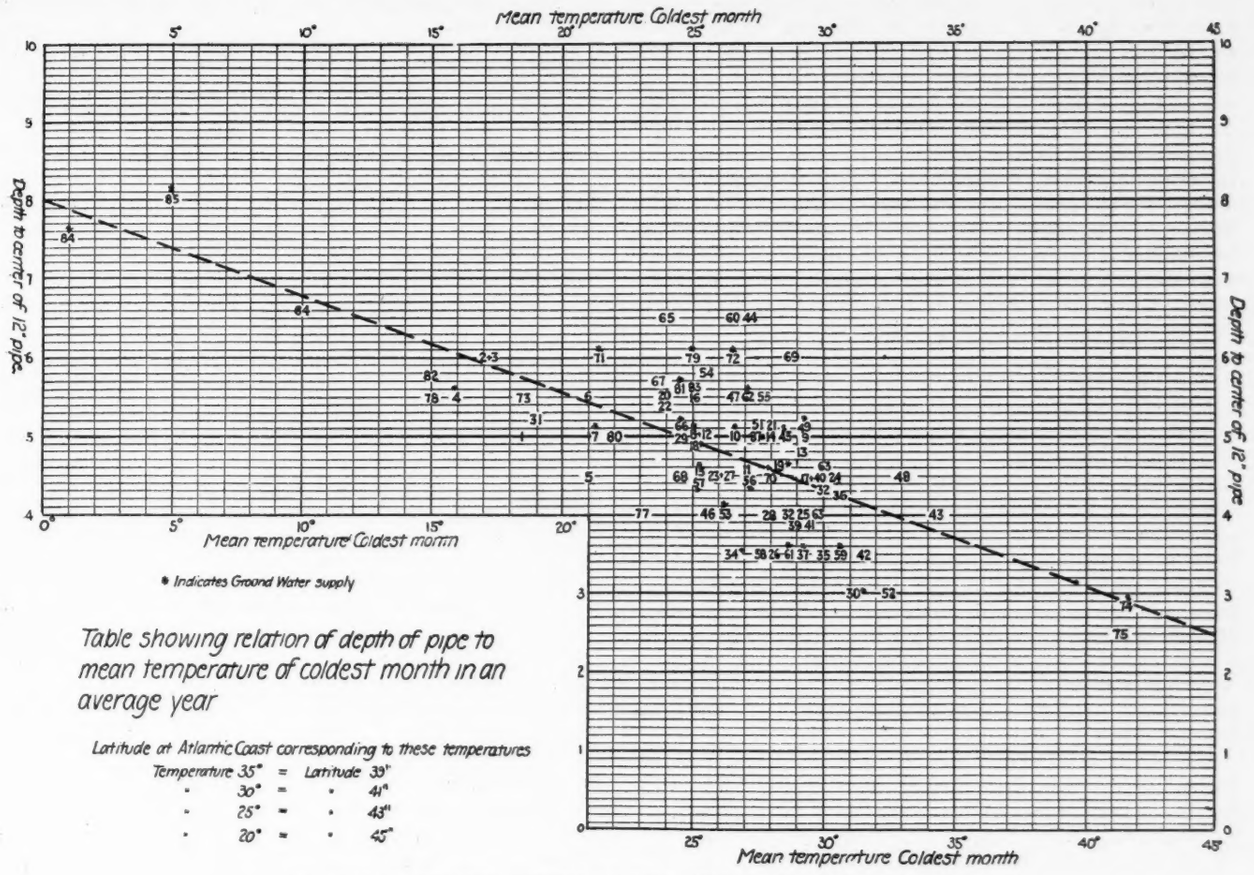
In determining the depth of pipe, the character of the soil and the surface of the ground are factors of some importance. In

Average Temperatures and Depths of Pipe

TABLE OF CITIES AND TOWNS, ARRANGED IN ORDER OF THEIR LATITUDE, GIVING AVERAGE YEARLY AND MINIMUM TEMPERATURE, BASED UPON UNITED STATES GOVERNMENT REPORTS AND DEPTH TO CENTER OF PIPE IN DISTRIBUTION SYSTEM.

Number used on diagram.	City.	Lat., approx.	Temperature. Average, yearly.	Temperature. Minimum, extreme.	Depth to Center of pipe.
86	Edmonton, Alberta	53.5	37.0±	—30±	*8.0
85	Regina, Saskatchewan	50.5	36.0±	—50±	*7.5
84	Winnepeg, Man.	50.0	36.0±	—53.5±	7-8
74	Everett, Wash.	48.0	52.0±	24±	2.83
75	Hoquian, Wash.	47.0	51.0±	18±	2.5
64	Ashland, Wis.	46.5	40.0±	—32±	*6.0
76	Charlottetown, P. E. I.	46.2	42.0±	.....	*5.0
82	Pembroke, Ont.	45.8	.....	.....	5.75
78	Montreal, P. Q.	45.5	42.0±	.....	†6.0
2	Bangor, Me.	44.8	43.6±	—21±	6.0
3	Brewer, Me.	44.8	43.6±	—21±	6.0
4	Rumford, Me.	44.5	43.1	—17	*5.0
	Belfast, Me.	44.4	43.6±	—21±	6.0
80	Kingston, Ont.	44.2	44.6±	—19±	5.0
1	Auburn, Me.	44.1	45.0±	—11±	4-5
68	Ludington, Mich.	44.0	46.0±	—10	*4.0
77	Yarmouth, N. S.	43.6	44.0±	.....	4.0
87	Rochester, N. Y.	43.2	48.6	—3	4.75-8.0
71	Mason City, Ia.	43.2	47.4	—13	6.0
79	Brantford, Ont.	43.1	50.0±	.....	*5.5
83	St. Catherines, Ont.	43.1	.....	—18±	*5.0
5	Dover, N. H.	43.1	46.0±	—10±	4.5
6	Manchester, N. H.	43.0	46.0±	—10±	4.5-5.5
65	Milwaukee, Wis.	43.0	47.9	—1	*6.0
67	Grand Rapids, Mich.	43.0	48.7	—6	5.75
81	London, Ont.	43.0	46.3±	—20±	*5.0
29	Canandaigua, N. Y.	42.9	49.0±	—3±	*4.5
31	Waterford, N. Y.	42.8	49.0±	—10±	5-5.5
7	Nashua, N. H.	42.8	47.7	—8	5.0
8	Billerica, Mass.	42.6	50.0±	—3±	*4.5
12	Fitchburg, Mass.	42.6	47.9	—5	*4.5
15	Lowell, Mass.	42.6	49.6	—3±	†5.0
16	Lowell (lks. & canals), Mass.	42.6	.....	.....	5.5
18	Reading, Mass.	42.6	50.0±	—3±	5.0
66	Ann Arbor, Mich.	42.5	49.1	—4	5.0
9	Boston, Mass.	42.4	50.0	—1	5.0
10	Brookline, Mass.	42.3	50.0±	—1±	4.5-5
11	Cambridge, Mass.	42.3	50.0±	—1±	*4.0
14	Hyde Park, Mass.	42.2	50.0±	—1±	*4.5
23	Worcester, Mass.	42.2	49.0	—4	4.5
19	Sharon, Mass.	42.1	48.0±	—5±	5.0
20	Springfield, Mass.	42.1	51.6	—5±	5.5
21	Stoughton, Mass.	42.1	49.0±	—5±	†3.5-5.5
22	Westfield, Mass.	42.1	52.0±	—5±	5.5
60	Elgin, Ill.	42.0	48.5±	—1±	*6.0
27	Rockville, Conn.	41.8	49.0±	—2	*4.0
13	Fall River, Mass.	41.7	49.4	1	4.5-5
17	New Bedford, Mass.	41.6	49.5±	3	*4.0
58	East Chicago, Ind.	41.6	51.0±	6±	3.5
73	Rock Springs, Wyo.	41.5	42.2	—21	*5.0
26	Norwich, Conn.	41.5	51.0±	2	3.5
28	Wallingford, Conn.	41.5	51.0	2	4.0
44	Cleveland, Ohio.	41.5	50.0	1	5.2-5.7
51	Lorain, Ohio.	41.5	50.3	12	5.0
72	Muscatine, Ia.	41.5	50.9±	0±	6.0
47	Elyria, Ohio.	41.4	50.0±	1±	*4.5-5
55	Oberlin, Ohio.	41.3	50.6	12	*5.0
25	New London, Conn.	41.3	50.7	2	*4.0
24	Bridgeport, Conn.	41.2	51.5	2	*4.0
40	Williamsport, Pa.	41.2	51.2	1	†5.0
57	Warren, Ohio.	41.2	50.0	10	†5.0
32	Yonkers, N. Y.	41.0	53.0±	5±	4-4.5
34	Mauch Chunk, Penn.	40.8	51.0	—5	3.0
37	Shamokin, Penn.	40.8	49.0±	—17±	*3.0
30	Woodhaven Water Co., N.Y.	40.7	53.3	5	†3.5
62	Peoria, Ill.	40.7	51.1	2	*5.0
69	Burlington, Ia.	40.7	51.5	—3	*5.5
70	Centerville, Ia.	40.7	49.5±	—9±	4.5
54	Lima, Ohio.	40.7	51.4	—4	5.83
33	Lewiston, Pa.	40.5	51.0±	—5±	4.0
38	South Pittsburg, Pa.	40.5	52.8	—3	*3.5
41	Wilkinsb'g, Pa. (Pa. W. Co.)	40.5	52.8	—3	*3.5-4.5
46	Dennison, Ohio.	40.5	52.0±	—6±	*3.5
	New Philadelphia, Pa.	40.5	50.5±	—7±	4.0
36	Reading, Pa.	40.4	53.6	4	4-4.75
39	Westmoreland Co., Pa.	40.3	52.8±	—3±	*3.5
42	York, Pa.	40.0	53.0±	1±	*3.0
56	Springfield, Ohio.	40.0	51.5±	—6±	*4.0
63	Quincy, Ill.	40.0	53.0	0	4.5
45	Dayton, Ohio.	39.6	53.0	—7	*4.5
52	Marietta, Ohio.	39.5	55.2	0	3.0
61	Mattoon, Ill.	39.5	53.5±	—11	*3.0
49	Hamilton, Ohio.	39.4	54.0±	—3±	5
43	Baltimore, Md.	39.2	56.0	8	*3.5
48	Gallipolis, Ohio.	38.9	57.0±	—4±	*4.5
59	Belleville, Ill.	38.5	55.5±	5	*3.0

*Depth to top of pipe. † Depth of trench.


Mean temperature Coldest month
Depth to center of 12" pipe
Mean temperature Coldest month
* Indicates Ground Water Supply
Table showing relation of depth of pipe to mean temperature of coldest month in an average year
Latitude at Atlantic Coast corresponding to these temperatures
Temperature 35° = Latitude 39°
" 30° = " 41°
" 25° = " 43°
" 20° = " 45°
Depth to center of 12" pipe
Mean temperature Coldest month

RELATION BETWEEN DEPTH OF PIPE AND MEAN TEMPERATURE

but very few places, however, from which replies were received is the nature of the soil taken into account in deciding as to the necessary depth at which the pipes should be laid. In 10 per cent of the replies it appears that some attention is paid to the character of the street surface, although apparently there is no prevailing rule. Some consider that a pavement is equal to one foot of cover; others that pipe should be laid deeper in a paved street. An average of the replies received indicates that freezing extends one foot deeper in streets than in fields; also that in streets frost will reach one foot 5 inches deeper in gravel than in clay, with sand half way between. In fields it would appear that frost will extend one foot farther in gravel than in clay, with sand again intermediate in effect. It is obvious that the character of the soil is a factor of such relative importance as to demand consideration in determining the economical depth.

Fifty-three places report actual experience in the freezing of pipes. All of these cases were in distribution systems and none in the leading mains. Fifty per cent were on dead ends and all were in pipes where there was little or no velocity. All but three of the cases of freezing were in pipes smaller than 10 inches in diameter, only seven in pipes as large as 8 inches in diameter; in all cases the ground was frozen below the axis of the pipe, and the ground-water level was also below the pipe. In 80 per cent of the cases the ground was bare of snow at the time of freezing. All stoppages were total. Thirty-five places report the character of the soil in which the pipes were laid; of these, 40 per cent were in clay, 48.6 per cent in gravel, 5.7 per cent in sand, and 5.7 per cent in rock.

The preceding table shows the latitude, average yearly and minimum temperatures (based on the United States Government Reports) of the places from which replies were received and also the depths at which the pipe was laid in these places. Obviously the temperature depends on other factors than latitude, and, believing that the mean temperature of the coldest month would provide a more satisfactory basis of comparison, a diagram with this temperature as the scale of the horizontal coördinate, and the depth as reported, as the vertical coördinate, has been prepared. On this diagram the different places, from which replies were received, have been plotted. There is much variation in the relation of depth to temperature of coldest month, as indicated by the practice in different cities and towns. Presumably this is explainable in most cases by peculiar local conditions; in others, perhaps, by an illogical adaptation of depth to the requirements.

On this diagram a line has been drawn which expresses the relation of depth to mean temperature of coldest month as indicated by an average of the replies received. It will serve to emphasize the variation in depth in cities and towns with the same mean temperature of coldest month, which in the extreme is illustrated by Mauch Chunk, Pa., and Cleveland, Ohio, the former satisfactorily operating pipes at a depth to axis of 3 feet 6 inches, and the latter believing 6 feet 6 inches to be necessary. Obviously local conditions other than temperature, and including depth of snow covering, must furnish, in great part, the explanation.

It will be noted that there is quite a marked grouping according to the depth used for pipe of cities and towns located geographically close to one another. The lesser depths employed in those places which appear below the average line are not explained by the use of ground-water supplies, as there are as many ground-water supplies above the average line as below. Those using shallow depths report practically no trouble, and the question remains whether this immunity results from peculiar local conditions or whether the general practice is unduly conservative. As already stated, it would seem that where there is any velocity of current, depths somewhat less than those indicated by this average line will generally prove sufficient to prevent freezing.

While all cases of freezing reported are stated to have resulted in total stoppage of the pipes, there are records of ice formation in concentric rings in pipes as large as 24 inches in diameter, the occurrences not being evidenced by stoppage of the large main, but only by loss of head through increased

friction, or, in some cases, by stoppage of gates or smaller pipe connections by the ice loosening and breaking up in a thaw and forming an ice jam at some point of obstruction. Such formation of ice in a layer adjoining the metal of the pipe has occurred in instances of extreme low temperature in the eastern Canadian Provinces in conduits where there was a considerable velocity. Obviously, as the ring of ice forms, the velocity of the water increases and a total stoppage does not result. In other cases of freezing, particularly in smaller pipes, the ice formation is not solid nor does it start from the outside, but is rather in the form of "slush" uniformly distributed throughout the cross-section of the pipe. This has been noted in a 4-inch pipe, in which there was considerable velocity, laid at a depth of 6 feet in a salt marsh in New Brunswick.

There is a belief or tradition in the minds of many plumbers and Water Works Superintendents that most stoppages by ice formation occur in a thaw which follows a period of severe cold weather, and the reason generally advanced for this alleged phenomenon is that the evaporation from the surface during the early stages of the thaw produces additional refrigeration or reduction of temperature at the depth of the water main sufficient to cause freezing. No indication of the existence of such conditions has appeared in the reports received of frozen pipes, and this reference is here made to induce the production of evidence, if any exists, in support of this theory.

Your committee regrets that the lack of comprehensive response to the circular has made impossible the collection of data sufficient for a more definite and conclusive report.

The members of this committee were as follows: F. A. Barbour, chairman; W. C. Hawley, W. C. Hoad, Emil Kuichling, R. S. Lea, Dabney H. Maury and R. Winthrop Pratt.

NOTES FROM VARIOUS CITIES

Many of the remarks which accompanied the reports sent in by the several cities are of considerable interest as expressing decided opinions or describing certain illustrative incidents. From Nashua it is reported that the supply "being ground water, with a relatively high temperature at wells and springs, in conjunction with a small reservoir with a capacity only 33 per cent greater than the daily consumption, must give our circulation a freshening and warming up which systems having a surface supply and a distribution storage reservoir do not get." This would seem to serve as a generally overlooked argument in favor of small distributing reservoirs.

In Boston the water pipes were originally laid 4 feet deep and severe freezing resulted. In 1865 the depth was increased to 4½ feet to the axis of the pipe, and freezing at dead ends still occurred. In 1892 the depth was increased to 5 feet to the axis, and no freezing of mains at that depth has since taken place. In Cambridge, Mass., it is found that pipes under street car tracks, from which the snow is removed by the railroad company, are among those most likely to freeze. This is an argument in favor of locating water mains along the sides of the street.

In Rochester, N. Y., 8-inch water mains laid on highway stone-arch bridges under the sidewalks, and with only 4 or 5 inches of covering, have frozen and burst. When this has occurred they have, on being repaired, been boxed up and surrounded with charcoal; and as an additional precaution every winter a good circulation is maintained by opening a tap in the main at one end of the bridge and allowing the water to run freely and constantly to waste. In Yonkers, N. Y., the flow in the supply mains is said to be constant at all times; for which reason, although in some places covered by only a foot of ground, they have never yet frozen. This is but one of many cities which report that no freezing ever occurs under the most extreme conditions of cold and location, where there is circulation in the pipe. The most extreme exposure is probably where the pipe is located on the floor of a bridge and unprotected. Many such are reported, and several cases of freezing in connection with them. Hamilton, O., however, had an exposed 10-inch main on a 550-foot bridge for ten years without its freezing.

Lewiston, Pa., says: "We endeavor to have every main circulate by eliminating dead ends, and where we must have a dead end we provide a blow-off which we open during extreme cold weather." Mauch Chunk, Pa., also opens all blow-off or drain gates in cold weather, which gates it provides at all low points and dead ends.

The question was asked of the cities whether the unusually low conditions of temperature which cause more or less freezing occur with sufficient frequency to justify a lowering of the pipe system. There was not a single affirmative reply to this; indicating, as the committee stated, that water mains are apparently being laid deep enough and that any change which is desirable would be in the way of decreasing rather than increasing depth.

Reports concerning the methods provided for draining fire hydrants were received from 81 cities. Fire hydrants are plugged and pumped out after use in Auburn, Bangor and Brewer, Me.; in Fall River, Mass.; Lima, O.; Ashland, Wis.; Burlington, Ia., and in wet ground at St. Catherines, Ont. Broken stone, gravel, etc., receive the water from a bottom drip in the case of 42 cities, while 18 others state that they drain into the ground, stone probably being used in these cases also except where the ground is quite porous. The drainage is carried to the sewer in all or some of the hydrants in 18 cities.

With reference to freezing in standpipes, few cities report any trouble, although a number state that such freezing takes place. For instance, Hyde Park, Mass., states that ice forms in their standpipe every winter, but has occasioned no damage. Reading, Mass., reports that an inside ladder was broken down by ice about 15 years ago and was not replaced. No other trouble has been occasioned. In Sharon, Mass., during a cold period in the winter of 1894-5, ice about ½ inch thick formed on the side of the tank which, when it was thawed by the sun each day, fell until a mass about 6 feet thick had accumulated. This thick mass pulled away and broke in sections, tearing off about 30 feet of inside iron ladder and at the same time pulling a few tap bolts through the sheet, but otherwise doing little damage. The consumption at night is very small and the water in the tank drops only about 12 inches an hour, affording a good opportunity for the formation of ice in severe cold spells. This ice shows 2 feet or more above the top of the tank.

Waterford, N. Y., had an interesting experience with a covered standpipe. This was built with a cone-shaped roof made of steel angle-iron supports which ran from a top angle iron on the upper sheet to a common center, where they were fastened to a heavy casting, these being cross-braced and covered with sheet steel. In 1903 very heavy pack ice formed in the standpipe, which would settle down at night when the pumps were shut down and would pack and jam together when the pumps started. As the pressure of the water became greater the ice would yield and huge masses, in some cases over a ton, would shoot up out of the body of the ice with great force and finally the whole ice jam would rise and press so hard against the roof structure and braces that it caused a rupture at the bottom row of rivets on the fourth sheet from the top and buckled the fifth sheet. The contributor of this information states that he "would never put a roof on a standpipe in this climate without providing a way to prevent pack ice from forming inside. Neither should a ladder or projection of any kind be placed inside."

Ice has been seen projecting from the top of the standpipe at East Chicago, Ind., to a height of 12 to 16 feet after a warm spell had thawed it free from the sides of the pipe. The Elgin, Ill., standpipe was wrecked several years ago by the fact that loose pieces of ice formed an arch at the surface of the water (probably at night while this was stationary) and remained in position until the water had lowered 25 or 30 feet, when it gave way and fell in a mass. In Kingston, Ont., ice forms in the standpipe 2 feet thick on the side and one foot thick on the surface, but has given no trouble, as it is always moving up or down with the water. In this, as apparently in

most of the others reporting, the admission and discharge pipe enters at the bottom and thus does not freeze. The Pembroke, Ont., standpipe freezes every year, about one inch of ice forming around the sides for a height of 20 feet and moving up and down with the rise and fall of the water. At Edmonton, Alberta, a most unusual precaution against freezing has been adopted, a 600,000 gallon standpipe being kept heated every day during the winter by a coal stove, which prevents any trouble from frost.

COMMISSION GOVERNMENT IN KANSAS

IN 1907 the Kansas Legislature passed an act enabling first and second class cities of that State to adopt Commission Government. Up to the present Leavenworth, Anthony, Independence, Hutchinson, Wichita, Kansas City, and Coffeyville, have adopted this form of government. Winfield is the only city which has voted against it. It is said that Topeka, Parsons, Manhattan, Junction City, Lawrence, Ottawa, Salina, Abiline, Concordia, Ft. Scott, Arkansas City, Chanute and others will vote upon the adoption of Commission Government within a few months.

In order to have the subject voted upon, a petition signed by ten per cent of the voters is required; and the petition, if found sufficient, makes it mandatory upon the Council to call an election. If the Commission form is adopted, a primary is held in the March following to select candidates for the Board of Commissioners. The two candidates for each membership receiving the highest vote become the candidates at the election in April. All candidates at the primary are nominated by petition. For cities of the first class, five commissioners are elected every two years; and in the smaller cities three commissioners are elected at the first election and one each year thereafter. No mark, emblem, or party designation of any kind is to be printed on the ballot. Each commissioner is required to give a bond of $10,000 to protect the city against financial loss by reason of incompetence, neglect or dishonest practices. Provision is made for the recall of any commissioner. Franchise terms are limited to 20 years, and 10 per cent of the voters may require an election to obtain popular consent thereto. The right of initiative of legislation also is secured.

STREET LIGHTING RATES

THE following table shows the rates paid by the principal cities of New York State, except New York City, for street lighting. The figures are taken from the reports of the companies on file in the State Public Service Commission for the Second District.

	Price per Arc Lamp per year	Population
Albany	$98.55	115,000
Amsterdam	39.00	25,000
Auburn	72.41	35,000
Binghamton	80.00	46,000
Buffalo Supplied by overhead conduits	56.00	425,000
Buffalo Supplied by underground	75.00	425,000
Corning	80.00	15,000
Elmira	80.00	45,000
Fulton	75.00	9,400
Geneva	73.00	14,000
Gloversville	86.40	22,500
Hornell	85.00	15,000
Hudson	81.75	12,000
Ithaca	75.00	16,000
Jamestown	52.00	32,000
Kingston	75.00	30,000
Little Falls	35.00	13,000
Lockport	55.00	22,000
Middletown	75.00	16,000
Malone	50.00	7,500
Newburgh	82.50	30,000
Niagara Falls	65.00	31,000
Ogdensburg	72.00	16,000
Oneida (1907)	37.50	10,000
Poughkeepsie	80.00	28,000
Rochester average	63.00	200,000
Rome	113.15	18,000
Schenectady	60.22	85,000
Syracuse	68.00	120,000
Towanda	57.50	8,000
Troy	94.90	85,000
Utica	56.00	70,000
Yonkers	105.00	73,000
Average price per lamp per year	$70.48	

CONCRETE PAVING AT MEMPHIS

In Use for Nine Years — First Laid Along Car Tracks and on Bridges—Proportions of Mix and Method of Laying —Perfect Condition After Seven Years

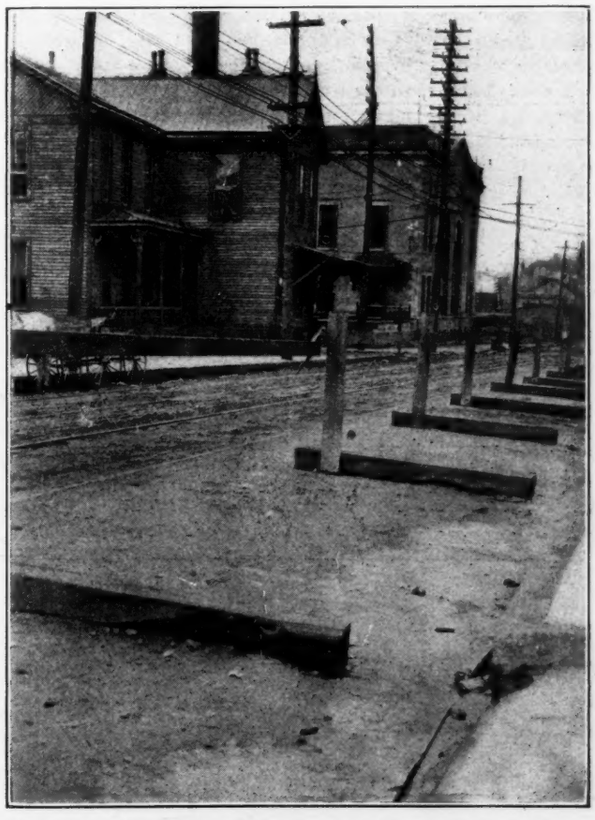
By J. H. WEATHERFORD, City Engineer.

PROBABLY no city is at present putting down more concrete pavement than Memphis, Tenn., and few, if any, have used such pavements for as long a time.

The first pavement of this character was a development of the concrete gutter, and was laid some ten years ago on a few streets for the purpose of preventing washing. Water in this city is carried, almost exclusively, on the surface, and where the streets are located at the foot of a large drainage area they necessarily carry an enormous amount of water. Gutters were therefore built six, eight and even ten feet wide, generally by city forces, and inasmuch as cheapness was the first requirement, they were built of old vitrified brick, broken concrete and such additional stone and gravel as was available, no top finish being used, and the surface simply being brought smooth by tamper and shovel.

In May, 1901, a stretch of concrete pavement, designated as "Moran Concrete," in that two stones of unequal hardness were used (a patent for which is held by Mr. Moran, of Memphis, but no charge is made to the city for its use), was put down under a specification of the writer (then in private practice), on a street about 22 feet between curbs and approximately 500 feet long, which street was occupied by a double-track car line, which occupied almost the entire street.

This street was, like the gutters, made up of six inches of first-class concrete, made of Portland cement, sand and equal parts of crushed granite and crushed limestone in the proportion of about one, two and four. This street was kept in use seven years before it was destroyed in order to relay the street car track on a different gauge. At the end of this period of use it was in almost perfect condition, except that portion lying against the tread of the rail, which wheels had cut up badly for about four inches from the rail.



CONCRETE PAVEMENT EFFECTIVELY GUARDED FROM TRAFFIC

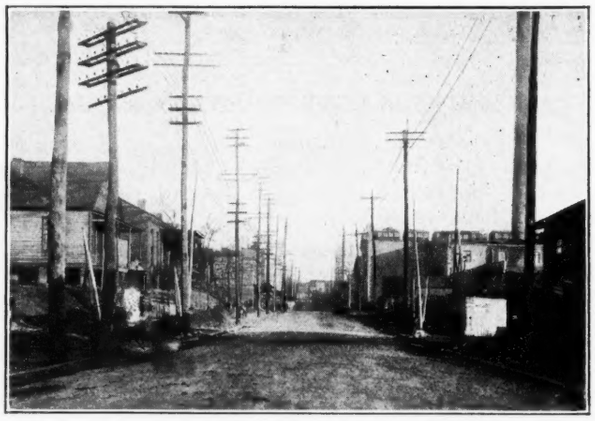
The next use of this material was on a reinforced concrete bridge which was built in 1903. This surface was finished with granolithic top one and one-half inches thick, and was marked off every six inches by a tool cut extending from curb to curb. This pavement has been in use since that time without repair of any kind, and is in extremely good condition, except that at the present writing it shows a slight wear at the points where the tool cuts were made. In 1905 a bridge pavement of the same material was laid, which also is in fair condition.

In November, 1908, a reinforced concrete bridge was built on Madison Avenue over Bayou Gayoso, which bridge was originally intended to be surfaced with asphalt. Just about the time of the completion of the bridge it was decided to pave the street on each side of the bridge with brick. The writer, who was then, as he is now, City Engineer, decided to put in an experimental stretch of concrete at this point. One-fourth of the bridge was covered with a three-inch layer of first-class concrete, made of fairly large stone, about one and one-half inches and under, limestone only being used; another one-fourth was laid with limestone three-fourths of an inch and under. The third quarter was laid with river gravel concrete, using gravel one and one-half inches and down, and the fourth quarter, by inadvertence, was laid with binder gravel, being all under one-half inch in size. This last portion of the surface broke up within one month after it was put in, and was replaced with limestone concrete.

At the present writing, November, 1909, about twenty months after the work was laid, the surface of the bridge presents a mosaic effect, and apparently has not worn to any appreciable extent, although subject to heavy traffic. The proportion of the concrete used was one and one-half barrels cement, one-half yard of sand and one yard of stone or gravel.

In December, 1908, a concrete bridge pavement was constructed on North Second street, over Bayou Gayoso; and in February, 1909, a similar bridge pavement was built on Front street over the same bayou, with a surface of plain concrete, without granolithic finish. These pavements up to the present show no appreciable wear.

Early in the fall of 1908 the writer succeeded in persuading the Council to adopt for some of its street work the "Moran Concrete," similar to that laid under his specifications in 1901, before mentioned. This concrete has been laid on Granville place, from Poplar avenue to Court avenue, a distance of 1270 feet, on a double roadway with a grass plot between, each roadway being twenty feet wide, and a concrete curb and gutter being used. In laying this street a twelve-inch gutter was laid as a part of the concrete curb, and a one-inch Sarco expansion joint was placed between the gutter and the pavement, a one-inch expansion joint of Sarco being also placed across the street every fifty feet. This work was completed in February, 1909, and has since been in use, and is in absolutely perfect condition. The traffic, however, is so light and infrequent as hardly to justify an opinion from this work as to the value of the pavement.



CONCRETE PAVEMENT ON BEALE AVENUE

Beale avenue was ordered paved with the same material from Orleans street to Walnut street, a distance of 1,475 feet, thirty-six feet between curbs, with 925 feet of double street car track thereon. The construction of this street was commenced, and 550 feet, without car track, was completed in July and put in use, but delay in the street car work has retarded the balance of this construction, so that it is not completed at the present time. The part in use has been under heavy traffic, and from present appearances bids fair to be an extremely satisfactory pavement.

Polk avenue from Mississippi boulevard to Walnut street, twenty-eight feet between curbs, is now under construction with the same material. The specifications for this and the preceding work provide that the subgrade shall be finished by hand six inches below the finished grade of the street and shall be thoroughly compacted by rolling. On the subgrade thus prepared six inches of concrete is laid, a very wet mixture being used, and the materials being proportioned as follows: One and a half barrels of approved Portland cement, one-half yard of clean sharp sand, and one yard of crushed stone, of which one-half shall be equal in hardness to Arkansas trap rock and the other one-half hard limestone. The stone shall be of sizes of 2½ inches and under, with the dust out.

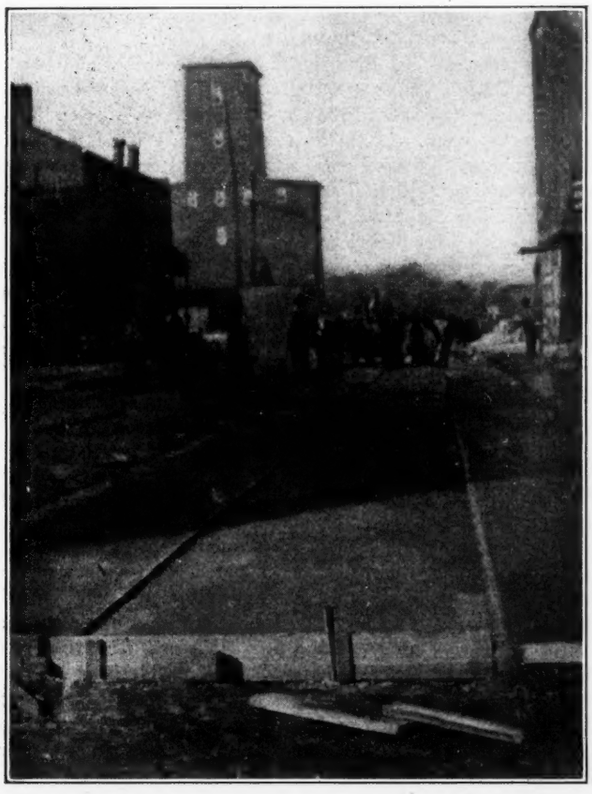
CONCRETE PAVEMENT IN GRANVILLE PLACE, MEMPHIS

This material must be mixed by hand, under very rigid inspection as to the amount of mixing, or with a batch mixer of an approved type. After depositing in the street the surface must be finished with a template consisting of a 2 x 12-inch board, one-half the width of the street in length, shaped to the cross-section of the street, and having a handle on each end by which it can be handled, two men being required for this purpose.

After the work is finished and the concrete has taken its initial set, the surface is covered with two inches of sand which, in very dry weather, is wet down occasionally and left on the street for at least two weeks.

A one-inch expansion joint of Sarco is placed across the street every fifty feet, and a similar joint along the curb. The bulk of the work is done against old granite curb, and where these already exist they are left in place. On new work, however, concrete curbs are built, and the concrete roadway is then laid as if the old granite curb has been used.

On all gravel streets, and on a good many of the asphalt, brick and granite streets, concrete curb and gutter are used, the gutter on the gravel streets ordinarily being made three to four feet wide, while that on other streets is made from twenty-four to thirty inches wide. The concrete for curb and gutter work is the same as that for the concrete roadway before mentioned, and is finished with a float. The face of the curb is spaded back next to the forms, so as to give a smooth surface of the fine stuff in the mix.



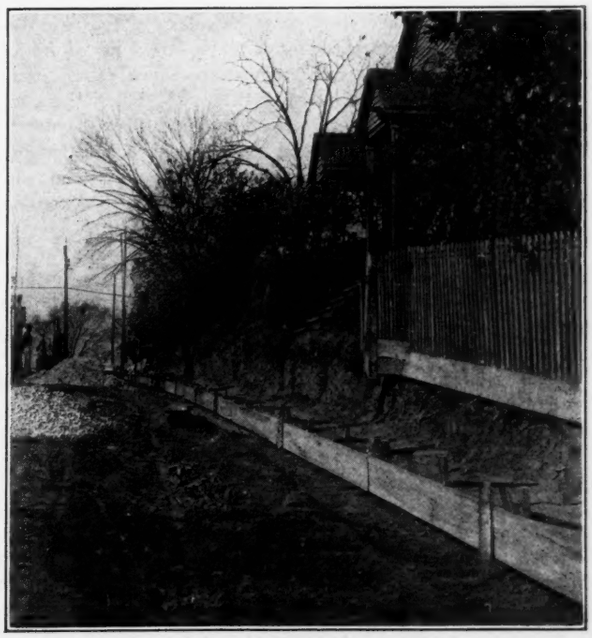
CONCRETE PAVEMENT ON RIGHT SIDE, ASPHALT ON LEFT

There has just been completed one block of pavement of which about 60 per cent of the width is asphalt and 40 per cent concrete. The object of putting a concrete pavement along one side of the street was because of the fact that teams are standing here most of the day during loading and unloading of goods for the warehouses which line this side of the street. A trolley track also is located on this stretch of street. The concrete is mixed 1:2¼:4½, the coarse aggregate being broken limestone of ¾-inch and 1-inch sizes. On this work, as on much of the concrete paving done in this city, a Foote mixer, No. 2½, is used. This turns out in actual work an average of about 110 square yards of 6-inch pavement per hour.

CONCRETE PAVING ON RAILROAD RIGHT OF WAY, BRICK OUTSIDE, JACKSON AVE., MEMPHIS

Where street car tracks are in the street the street car company builds that portion between their tracks and for two feet outside of the outside rails. In the standard construction which they have adopted where concrete streets are used or in other streets where they are permitted to use concrete, a very wet mix is placed beneath the ties and surrounding the same up to and flush with the top of the rails. The concrete work is made monolithic and is finished with a straight edge resting on the top of the rails. They have, however, laid an experimental strip, approximately 4,300 feet long, consisting of a foundation with a three-inch wearing surface on the same, all of concrete. This construction, however, has not been entirely satisfactory, and all concrete is now made monolithic. No expansion joints are used for this concrete, it being believed that the rails will form sufficient reinforcement to prevent the cracking of the concrete.

In connection with the concrete curbs the city builds storm water inlets with the openings in the face of the curb, and covers the same with a slab of reinforced concrete four inches thick and generally 4 x 6 feet, this being reinforced ordinarily with four ½-inch corrugated rods and expanded metal, No. 10 gauge, six inches mesh. In these slabs is placed a light manhole rim 18 inches inside dimension and four inches deep, which is covered by a light top. This gives access to the inlets for cleaning and in extraordinary cases the entire slab may be removed.



FORM FOR CURBING, SHOWING GOOD VERTICAL CURVE. SIDEWALK, CURB AND PAVEMENT ALL OF CONCRETE

REGULATION OF STREET TRAFFIC

New York Rules and Ordinance—Adopted by Lexington and Louisville and Proposed for St. Louis—Education of Drivers Most Important

In the small city, where streets are provided adapted to the amount of traffic which uses them, in accordance with principles which have previously been discussed in these columns, there is little necessity for actual regulation of traffic in the roadways, it generally being sufficient if the drivers observe the well-known rule of keeping to the right of approaching teams and passing on the left. But in large cities, where certain arteries of travel are crowded with vehicles during a large part of the day, confusion is sure to occur and occasionally a complete tie-up of traffic for several hours unless some special and intelligent regulation of the traffic be enforced. All of the large cities of Europe and America now make some effort at such regulation in their principal traffic streets, and some of the smaller ones are finding this desirable on certain thoroughfares leading to the principal traffic centers. An illustration of the latter is offered by Lexington and Louisville, Ky., and by St. Louis, where the Municipal Assembly has appointed a special joint committee to investigate the traffic conditions of the city and report a set of rules to be adopted and methods of enforcing them. As a result a bill embodying these has been introduced which it is expected will pass before long. These rules are practically those adopted for New York City by the Police Department, and forming the basis of traffic regulation by the traffic squad of that department. The New York rules have also, it is said, been adopted, with slight changes, by the city of Paris within the past few weeks.

Previous to 1900 there was practically no regulation of traffic in New York, and no system of rules having any official sanction. At that time it was not unusual to find traffic stalled for hours at a time on some of the principal thoroughfares of the city, while the police were endeavoring to untangle the mass of vehicles as rapidly and intelligently as their limited power and inexperience permitted. The police realized the desirability of a decided improvement in these conditions, but it is probable that the present change for the better is most largely due to Mr. Wm. Phelps Eno, who for years has made a study of conditions and methods in Europe as well as in the United States. He was the author of the present rules practically as they are now enforced, and to his efforts was largely due the creation of the traffic squad for carrying out these rules. In 1903 Mr. Eno furnished the Police Department with 70,000 copies of folders containing the rules for traffic regulation, which were distributed by the police to the drivers of the city. At first there was considerable opposition to these regulations among the drivers and teamsters, but it was not long before they realized that they were more to the advantage of themselves than of any one else, and failure to cheerfully obey the traffic squad is now confined largely to ignorant or intoxicated drivers.

The traffic squad at the beginning of 1909 consisted of 680 men, in addition to which there were 32 men in the license squad and 31 men taken from the bridge squad for traffic duty at theatres. Of these 438 are mounted, 18 are on bicycles and the remainder are on foot.

While exerting himself in the interest of traffic regulation, Mr. Eno has written a number of articles for the press in order to educate the people, and especially drivers, in the subject, and many of these articles have recently been published in book form.

Concerning street traffic regulations, Mr. Eno considers that it is of the first importance to educate the drivers and make the regulations operate automatically as far as possible. To secure this result the regulations should be concise, simple and just, easily understood and conforming to the existing laws. Copies should be posted and distributed, so that no one can offer the excuse of ignorance. The police should be empowered and ordered to enforce them and should be trained for that purpose. With all the drivers educated, the duties of the police will be confined to assisting the majority who wish to have them enforced in compelling the unwilling minority to live up to them. The folder now issued by the Police Department for the education of drivers is given herewith, and is an improvement and slight enlargement of the one first issued in 1903. Some of the rules are adopted from the laws of the state or ordinances of the city. Others were taken from the "Traffic Act and Regulations" of Sydney, N. S. W., and the remainder were largely original.

The police are instructed to take down the name and address of any offenders and report particulars to the Bureau of Street Traffic on his return to the station house. He is advised not to make arrests except in very unusual cases, because it takes him away from his other duties, may impose an unjust hardship on the driver and a serious inconvenience to his employer. As the majority of wagons contain the names of their owners, and likewise numbers or other means of identification, it is not difficult to summons the driver afterward. The Bureau of Street Traffic keeps a record of arrests or complaints in order that frequent violators may be discovered and severely punished.

In 1903 signs giving certain directions were placed on posts near the curb, these being of blue and white enamel, 10 by 19 inches. These were found to be too small, and others tried later were found to be too large, and it is believed that probably the best sign is one about 12 by 23 inches, reading as follows:

DRIVERS KEEP TO THE RIGHT NEAR CURB,
EXCEPT WHEN PASSING VEHICLES AHEAD.

Rules for driving and the regulation of street traffic can be obtained at all police stations.

It is recommended that signs similar to these be hung on brackets at right angles to the street and so high as not to interfere with the tallest vehicles. In certain streets of New York, between the hours of 7 A. M. and 7 P. M., traffic is permitted to move in one direction only, and on such streets signs stating this and indicating the direction by a large arrow are placed at intervals along the street.

Concerning isles of safety, Mr. Eno states that these should not be less than 8 feet nor more than 15 in length. The width will be determined largely by that which can be spared from the roadway. The best form is one with parallel sides and elliptical ends. Its height above the roadbed should be from 5 to 8 inches, since less than this would afford insufficient protection, and more than 8 would make the step undesirably high. Each end of the refuge should be protected by a post which should slope in from the roadway a sufficient amount to prevent the hub of the wheel striking it. Many of the isles in New York City have low vertical posts of granite, and these are being continually knocked off by vehicles.

As stated above, the New York regulations are proposed for St. Louis, and have already been adopted, with slight changes, by Lexington and Louisville, Ky. The St. Louis rules contain certain additions to the New York ones. One set of these apply to speed, it being provided that no vehicles shall be driven "at a rate of speed which is not reasonable, considering all of the surrounding circumstances," or with "a reckless or negligent disregard of the condition there obtaining and the rights of others." It is also ruled that privileged vehicles are not authorized to be driven at a faster speed than is permitted to other vehicles, except when responding to emergency calls. Other additions are: "No driver of a vehicle shall stop the same abreast of another vehicle lengthwise of a street, except in case of accident or emergency." "No driver of a vehicle shall allow the same to come within ten feet of any vehicle when approaching or passing over a crossing where a pedestrian would be endangered." "No person shall drive, guide or have the care of two or more horses harnessed, respectively, to two or more vehicles." No one shall steal a ride on any vehicle or street car, and no one shall ride upon the rear of any vehicle without the consent of the person in charge thereof." "No rider of a bicycle shall remove both feet from the pedals or both hands from the handle bars or practice any trick or fancy riding in any public streets." "No bicycle rider shall carry upon his bicycle any child

under the age of seven years." "No person shall skate on roller skates in any public street." "Any person violating any provision or any of the regulations thereof shall be deemed guilty of a misdemeanor, and upon conviction thereof, either upon confession of the party or upon competent testimony, shall be fined for such offense not less than $10 nor more than $100."

POLICE DEPARTMENT RULES FOR DRIVING AND THE REGULATION OF STREET TRAFFIC

ISSUED BY THE POLICE DEPARTMENT OF THE CITY OF NEW YORK.

Article I. Importance of Keeping to the Right, Passing, Turning, Crossing and Stopping.

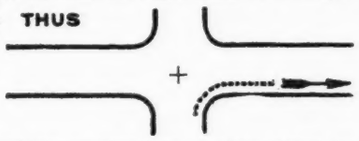
Sec. 1. A vehicle, except when passing a vehicle ahead, shall keep as near the right-hand curb as possible.

Sec. 2. A vehicle meeting another shall pass to the right.

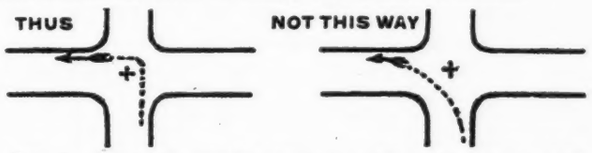
Sec. 3. A vehicle overtaking another shall pass on the left side of the overtaken vehicle and not pull over to the right until entirely clear of it.

Sec. 4. On an avenue or street, divided longitudinally by a parkway, walk, sunkenway or viaduct, vehicles shall keep to the right of such division.

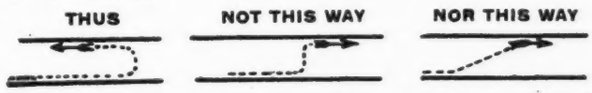
Sec. 5. A vehicle turning into another street to the right shall turn the corner as near the right-hand curb as practicable.



Sec. 6. A vehicle turning into another street to the left shall turn around the center of intersection of the two streets.



Sec. 7. A vehicle crossing from one side of the street to the other shall do so.



Sec. 8. No vehicle shall stop with its left side to the curb except on established cab, hack and truck stands, and in streets where and when one-way traffic is directed by white arrow signs.

Sec. 9. No vehicle shall stand backed up to the curb except when actually loading or unloading, and if said vehicle is horse-drawn and has four wheels, the horse or horses must stand parallel to the curb and faced in the direction of traffic, but no vehicle shall stand so backed up if it interferes with or interrupts the passage of other vehicles or street cars.

Sec. 10. No vehicle, unless in an emergency or to allow another vehicle or pedestrian to cross its path, shall stop in any public street or highway, except near the right-hand curb thereof and so as not to obstruct a crossing.

Sec. 11. No vehicle shall back to make a turn in any street, if by so doing it interferes with other vehicles, but shall go around the block or to a street sufficiently wide to turn in without backing.

Article II. Signals.

Sec. 1. In slowing up or stopping, a signal shall be given to those behind by raising the whip or hand vertically.

Sec. 2. In turning, while in motion, or in starting to turn from a standstill, a signal shall be given by raising the whip or hand, indicating with it the direction in which the turn is to be made.

Sec. 3. Before backing ample warning shall be given, and while backing unceasing vigilance must be exercised not to injure those behind.

Sec. 4. One blast of police whistle indicates that north and south traffic shall stop and that east and west traffic may proceed. Two blasts that east and west traffic shall stop and that north and south traffic may proceed. Vehicles and street cars shall stop so as not to interfere with the passage of pedestrians at the crossings. Three or more blasts is a signal of alarm and indicates the approach of a fire engine or some other danger.

Sec. 5. No vehicle shall be used on any street or highway unless provided with lights and sound signals as prescribed by law.

Article III. Right of Way.

Sec. 1. Police, Fire Department, Fire Patrol, Traffic Emergency Repair, U. S. Mail vehicles and Ambulances shall have the right of way in any street and through any procession.

Sec. 2. Subject to Sec. 1 of this article, everything being equal, all vehicles and street cars going in a northerly or southerly direction shall have the right of way over all vehicles and street cars going in an easterly or westerly direction.

Sec. 3. Subject to Sec. 1 of this article, street cars shall have the right of way between cross streets, over all other vehicles; and the driver of any vehicle, proceeding upon the track in front of a street car, shall immediately turn out upon signal by the motorman, driver or conductor of the car.

Sec. 4. No vehicle or street car shall so occupy any street as to interfere with or interrupt the passage of other street cars or vehicles.

Sec. 5. No vehicle shall stand headed, or be driven, on any street marked by a white arrow sign except in the direction indicated by the arrow; but it may stop at either curb during the hours indicated on the sign, the usual rule of right side to curb being in force at other hours.

Sec. 6. No vehicle shall be driven, during crowded traffic hours, on any crosstown street, where there are car tracks, except for such distance as may be reasonably necessary to reach the building to which it is going.

Sec. 7. A vehicle waiting at the curb shall promptly give place to a vehicle about to take on or let off passengers.

Sec. 8. The driver of a vehicle, on the approach of a fire engine or any other fire apparatus, shall immediately draw up said vehicle as near as practicable to the right-hand curb and parallel thereto and bring it to a standstill.

Sec. 9. The driver of a street car shall immediately stop said car and keep it stationary upon the approach of a fire engine or other fire apparatus.

Article IV. Speed.

Sec. 1. No vehicle shall proceed at any time at a greater speed than the law allows and is safe and proper under the conditions then obtaining.

Sec. 2. No vehicle shall cross any street or avenue running north and south or make any turn at a speed rate exceeding one-half its legal speed limit.

Article V. Overtaking Street Cars.

A driver of a vehicle overtaking a street car shall exercise due caution not to interfere with or injure passengers getting on or off said car.

Article VI. Control of Horses.

Sec. 1. No horse shall be left unattended in any street or highway unless securely fastened or unless the wheels of the vehicle to which he is harnessed are securely tied, fastened or chained, and the vehicle is of sufficient weight to prevent its being dragged at a dangerous speed with wheels so secured.

Sec. 2. No horse shall be unbitted in any street or highway unless secured by a halter.

Sec. 3. No one shall remove a wheel, pole, shaft, whiffle-tree, splinter-bar or any other part of a vehicle or any part of a harness, likely to cause accident if the horse or horses start, without first unhitching the horse or horses attached to said vehicle.

Sec. 4. No one shall cease to hold the reins in his hand while riding, driving or conducting a horse.

Article VII. Vehicles.

Sec. 1. No one shall drive a vehicle that is so covered in or constructed as to prevent the driver thereof from having a sufficient view of the traffic following and at the sides of such vehicle.

Sec. 2. No one shall drive or conduct any vehicle in such condition, so constructed, or so loaded as to be likely to cause delay in traffic or accident or injury to man, beast or property.

Sec. 3. No one shall so load a vehicle, or drive a vehicle so loaded, with iron or other material that may strike together without its being properly "deafened," so as to cause no unnecessary noise.

Sec. 4. No one shall drive a public, numbered, licensed or business vehicle, who is less than sixteen years of age.

Sec. 5. No one shall ride upon the rear end of any vehicle without the consent of the driver, and when so riding no part of the person's body shall protrude beyond the limits of the vehicle.

Article VIII. Condition and Treatment of Horses.

Sec. 1. No one shall ride or drive a horse not in every respect fit for use and capable for the work upon which it is employed and free from lameness or sores calculated to cause pain, or any vice or disease likely to cause accident or injury to person or property.

Sec. 2. No one shall ill-treat, over-load, over-drive, over-ride or cruelly or unnecessarily beat any horse.

Sec. 3. No one shall crack or so use a whip as to annoy, interfere with or endanger any person or excite any horse other than that which he is using.

Article IX. The Respective Rights and Duties of Drivers and Pedestrians.

The roadbeds of highways and streets are primarily intended for vehicles, but pedestrians have the right to cross them in safety, and drivers of vehicles and street cars must exercise all possible care not to injure pedestrians. Pedestrians should, on their part, never step from the sidewalk to the roadbed without first looking to see what is approaching, and should not, needlessly, interfere with the passage of vehicles or street cars.

By crossing a street as nearly as possible at right angles, preferably at a regular crossing, and when a traffic policeman is stationed there, by waiting for his signal, pedestrians will greatly add to their own safetly, facilitate the movement of traffic, and make it much less difficult for the horses, which often have to be reined in suddenly and painfully to avoid careless and unthinking pedestrians. Nothing in the foregoing should excuse drivers from constant vigilance to avoid injury to pedestrians under all conditions.

Article X. Definitions.

Sec. 1. The word vehicle includes equestrians, led horses and everything on wheels or runners, except street cars and baby carriages.

Sec. 2. The word horse includes all domestic animals.

Sec. 3. The word driver includes the rider and driver of a horse, the rider of wheels and the operator of a motor vehicle or street car.

Article XI. Obedience.

Sec. 1. Drivers of vehicles and street cars must at all times comply with any direction by voice or hand, of any member of the Police Force, as to stopping, starting, approaching or departing from any place; the manner of taking up or setting down passengers or loading or unloading goods in any place.

Sec. 2. Ignorance of these rules shall furnish no excuse for disregarding them.

Copies of these rules can be obtained at the Bureau of Street Traffic and at all Police Stations.

For further particulars see Charter of the Greater City of New York, Penal Code, Sanitary Code and City Ordinances.

All drivers of vehicles are required to comply with these rules in order to facilitate traffic, prevent blockades, avoid accidents and loss of life, and diminish the loss of time and money due to the lack of observance of rules for the regulation of street traffic.

The Police Force will strictly enforce the foregoing rules.

Complaints against drivers of cabs and other numbered vehicles should be made at the nearest Police Station, for record at the Bureau of Street Traffic.

THEO. A. BINGHAM,
Police Commissioner.

February 8, 1909.

TANK TREATMENT OF SEWAGE

Classification of Tanks — Advantages — Septic and Non-Septic Conditions — Hydrolytic Tank—Slate Bed—Continuous and Quiescent Flow—Vertical Tanks

A SUMMARY of present information on the subject of tank treatment of sewage in England, from an engineering rather than chemical point of view, has been presented quite concisely in a paper by Mr. A. P. I. Cotterell before the Incorporated Association of Municipal and County Engineers of England. This paper we present below, slightly condensed.

The Royal Commission on Sewage Disposal has proposed, and quite rightly, to differentiate, not only between sewage of varying strengths, but also between the different kinds of tanks generally used for primary treatment. Sewage, as we know, has been roughly divided by them into three classes—strong, medium, and weak. They also propose that the general design of the remainder of the works, especially the capacity of the filters, shall be dependent upon the class of primary tank that is adopted, basing their figures upon five different types of tank more or less representative of those at present in use, viz.: (*a*) Septic tanks; (*b*) continuous flow settlement without chemicals; (*c*) quiescent settlement without chemicals; (*d*) continuous flow settlement with chemicals; (*e*) quiescent settlement with chemicals.

A consideration that naturally arises is whether rather more distinction should not be drawn between the various types of tank in addition to their method of use; whether, for instance, it is wise to place vertical-flow and horizontal-flow tanks exactly on the same basis. It is also hard to say in what class a special type of tank such as the hydrolytic or the slate-bed tank should be placed.

All are generally agreed that, except possibly in very small sewage works, tank treatment, even if it be only a detritus tank, is necessary. Even with land irrigation some form of tank is valuable, and tends to reduce the liability of nuisance through clogging or ponding of the surface.

In designing or adopting a certain kind of tank it is needful to take account of the kind of sewage to be expected. A sewage comprising or largely consisting of trade waste needs different treatment from a domestic sewage. Regard should also be paid to the sewerage system, whether the sewers are so extensive or so badly laid that sedimentation and even septic action has already commenced before the works are reached.

The object of tank treatment is to produce a satisfactory effluent at as little expense as possible, and a satisfactory effluent may be defined as a readily oxidizable liquid containing not more than 20 parts of suspended solids per 100,000. The formation of sludge, except as a means to this end, is not sought for. Whether the day will ever come when sludge will be accumulated because of its own value it is impossible to say. It certainly is not here yet. If it comes, the purification of sewage will become a simple matter. One of the advantages of tank treatment is that it tends to equalize the sewage. This is especially the case with the septic tank, because its capacity is greater than other types. The subdivision of tank treatment by construction of a small preliminary detritus tank to intercept grit and mineral matter is general, except in very small works. The tendency is now to make detritus tanks smaller, so as to act as catchpits only. The board ask that they shall be not more than 1/100th dry-weather flow. Many detritus tanks are too large, and act as liquefying tanks.

The method of gauging flow through a horizontal tank by the capacity can only be regarded as a very rough approximation. It cannot be said that a tank containing twenty-four hours' dry-weather flow discharges its contents in the same sequence as they entered. The rate of flow through a channel is represented by a parabola, of which the apex is slightly beneath the surface of the water. Some sewage will, therefore, come through the tank fairly quickly at the rate represented by the apex of the curve, while some will stay there a considerable time, quite apart from the variable inlet flow. This tendency to hug the surface in the center of the tank takes place in spite of dipping-boards, which merely give the sewage slightly longer travel rather than cause it to mix with the lower contents of the tank. What does mix with the sewage is the decomposition of the sludge and the cross-current of the vertical ascending gases meeting the horizontal flow of the liquid. But as a consequence the effluent carries over suspended solids to the detriment of the filters. Much of this mixture in a septic tank has reached an advanced state of putrefaction, and is, therefore, more difficult to deal with. It is one of the disadvantages of the septic system.

The converse is also true. If sewage passes through the tank too quickly and in too fresh a state (as in the form of fat) it is detrimental to the filters. The ideal is to hit the happy medium. This is very difficult, because of the variations already alluded to.

Fall is always a very important factor at sewage works. Unless pumping is adopted there is generally far too little of this commodity. Those tanks, therefore, where the outlet level is almost as high as the inlet have a distinct advantage over those where the outlet is at the base of the tank.

The Royal Commission finds no appreciable difference in purification between a covered and an uncovered septic tank. It is a great disadvantage in a covered tank that the process of liquefaction cannot be watched, and over-septicization is not seen until its bad results are apparent at the outlet. The idea of practically utilizing the gas in a septic tank must be given up except in hot countries. On the other hand, some covering to protect from sight and from wind is an advantage to septic sewage. The ideal would appear to be a roof over the tank under which men can work.

A septic tank requires a coarse-grained filter because of the large proportion of suspended solids brought over. The commission put this at 15 to 20 parts per 100,000, but at times it may even be much greater for the reason already stated. At such times even a coarse-grained filter is unduly strained, and sooner or later the works must suffer.

It is now fairly clear that it is safer to draw off small quantities of sludge from septic tanks at frequent intervals than to run the risk involved by allowing a long period to elapse. All this tells against the septic tank, which was never designed for the rapid removal of sludge. In fact, in the earlier tanks no provision was made for sludge removal, and none was apparently anticipated.

The hydrolytic tank is only mentioned by the commission, but it needs much fuller treatment. Its mechanical value is considerable. In a sense it is a scientifically designed septic tank in which the mechanical disadvantages of the latter are largely avoided, but taken in conjunction with the hydrolyzing chambers that follow it emphasizes the value of the mechanical treatment of sewage. Very little reliance is in fact placed on anything else at Hampton. There is admitted to be some oxidation in the filters, but bacterial action is considered of very little account. Instead of the liquefaction claimed in the septic tank, the opposite is claimed to take place in the formation of colloidal matter. When closely examined, however, the contradiction is more apparent than real. It is possible for both processes to go on. But the value of the mechanical operation has been too much overlooked in recent years, and it is well that attention should be thus directed to it again. In Germany, as may be known, much attention has been directed to this feature of sewage disposal.

The slate beds also incidentally referred to by the commission appear to be at the opposite pole to the hydrolytic tank. The commission rightly regards the slate-bed tank more as a preliminary tank than as a contact bed, though they are scarcely right in calling it a septic tank, seeing that its action is aërobic and not anaerobic. The commission are now, however, investigating more closely.

In one sense the hydrolytic tank and the slate bed have something in common, in that they both aim at exposing numerous surfaces for the mechanical retention of solids, Dr. Travis in

his hydrolyzing chambers, and Dr. Dibdin on his slates. The difference (and it is a marked one) is that the latter claims the aid of numerous worms and low forms of aerobic life to reduce the sludge on the slates to "humus." Here, as in the case of the septic tank, from which it differs so completely, care must be exercised to prevent an excess of solids being washed out to the filters. The intervention of a wide channel or an upward flow tank is desirable. The author is adopting the latter course for the new sewage works at Harpenden.

As regards settlement tanks, both continuous or quiescent, and with or without chemicals, all forms of rectangular tank appear to be suitable provided they are not so large as to set up septic action in any marked degree. The limits given by the Royal Commission are quiescent settlement for two hours or continuous flow settlement for fifteen hours when no chemicals are used, and quiescent settlement for two hours or eight hours' continuous flow settlement when chemical precipitation is adopted. It is a little difficult to know what they mean, but apparently the number of hours' settlement refers to the capacity of the tank, although for the reasons already stated this is scarcely an accurate gauge of the flow through the tank.

It is well to draw a distinction between continuous and quiescent flow in favor of the latter. The reason is easily seen, in that a period of rest allows of the deposition of solids in a horizontal-flow tank which otherwise would be washed over into the outlet by the cross-currents already referred to, and by the fact that by the law of flow the whole contents of the tank are in a state of motion except sludge, which has so settled that its specific gravity is appreciably greater than water. Therefore, some suspended solids must in course of time come over. In the hydrolytic tank this is largely avoided by the depth of the lower or liquefying chamber and the narrowness of the overflow weir.

Vertical or upward-flow tanks are not specially referred to by the commission, except as a substitute for the macerating tank or roughing filter sometimes interposed between the primary and secondary treatment. But it has claims as a primary settlement tank, especially when used in connection with chemical precipitation. Mechanically it is more efficient than a flat-bottomed settling tank, in that the two lines of flow, the falling solids and the rising liquid, are directly opposed, and clarification is more rapid. A vertical tank can never act properly as a septic tank, because the length of stay of the sewage is too short, and septic action can only be set up by a huge collection of foul sludge. In a test made by the author on a vertical tank with a capacity of 8,500 gallons to the commencement of the cone base, an inlet depth of 12 feet and a diameter of 12 feet, the time of passage from inlet to outlet was only five minutes, and most of this was occupied by the float in traveling horizontally across the tank to the outlet, but the clarification was remarkable. The vertical tank also lends itself to the frequent removal of small quantities of sludge. A difficulty has been found in the tendency of water to escape up the sludge pipe before the sludge, but if the sludge pipe is started downward from the apex of the cone bottom, so that gravitation may help the flow of sludge, this may be largely avoided. The vertical tank is simple to build, in spite of being deeper than the horizontal tank, and is less liable to settlement.

These notes do not presume to touch upon all the points that may be raised in connection with tank treatment, for they are too numerous to be dealt with in a paper such as this. But they are intended as a discussion of the subject from an engineering point of view, this being the position from which probably most of us find it needful to approach it.

In discussing this paper one of the members criticised Mr. Cotterell's definition of a satisfactory tank effluent, since he thought it obvious that the satisfactoriness of an effluent depends largely upon the secondary process to be applied to it. In fact, many of the sewages to be dealt with complied with the definition without any tank treatment at all. He also objected to the proposition that a septic tank must be followed by a coarse-grain filter, as that depended upon the amount of solid matter in suspension which left the tank. If this amount was relatively small the effluent could be treated on a fine-grain filter, as was done at Hanley with good results. He called attention to the fact that Dibdin's slate filters were worked originally as contact beds under aerobic conditions, whereas Dr. Travis operated his under anaerobic conditions. Also Mr. Dibdin claimed that the whole of the sludge was resolved in his tank, while Dr. Travis frankly admitted that sludge would be desposited in his tank and must be removed.

Mr. Cotterell, in replying and supplementing his paper, stated that he still believed in the advisability of his definition of satisfactory effluent. If a sewage was dealt with having as low as 20 parts per 100,000 of suspended matter, he believes that tank treatment was entirely unnecessary. As to the collection of *sediment* in the slate and Travis tanks, he was perfectly convinced that there would be sludge collected in some part of any sewage disposal system. If no sludge collected in the Dibdin slate beds it was because it passed out at intervals with the effluent and onto the beds, although undoubtedly changed in character and quantity.

CITY'S POWER OVER STREET CAR STOPS

HAS a municipality the power to compel a street railway to stop its cars at every street corner? It has recently been held that this cannot be done, at least in a village.

The case to which we refer (village of Excelsior versus Minneapolis & St. Paul Suburban Ry. Co., 122 N. W. 486) was decided in September by the Minnesota Supreme Court. A writ of mandamus had been issued by the lower court at the instance of the village. The railway company had been authorized by ordinance to operate within the village limits under a five-cent fare proviso. After the railway had been built, a village ordinance was passed which required the stoppage of cars "at any and all of the intersections and crossings of streets when any person or persons require to enter or alight from such cars, provided such crossings are grade crossings."

The village contended that the ordinance was a legitimate exercise of police power, and it was conceded by the appellate court, "for present purposes," that the council had the authority to pass a proper ordinance in the exercise of such power. While the court was of the opinion that the village had the right to pass reasonable ordinances regulating the stoppage of cars—ordinances incidentally conducive to the comfort and convenience of the community—it did not follow that an ordinance designed entirely for the comfort and convenience of the inhabitants was a valid exercise of the police power.

Counsel for the company urged that the ordinance did not apply to the particular facts in the case, as the ordinance expressly referred to lines of the company which are located upon a public street. At the point in question the company had constructed its lines upon its own right of way, and not along the street. The fact that the company's lines crossed streets and alleys did not bring it within the ordinance, as the court had previously held, in an action to which the company had been one of the two parties, that "the crossing of streets and alleys incidental to constructing a railroad from place to place, does not constitute the occupancy of such streets or alleys for the purpose of operating a railway thereon."

"In view of the great importance of the public question involved," the court was unwilling to rest its decision upon any one ground or to abstain from the determination of the larger questions involved. It was clearly of the opinion that the contract with the village under which the company operated did not authorize the ordinance, which had to be reasonably construed.

The company was not a mere street railroad, but had been held, in the case to which we have already referred, to have been organized to construct and operate interurban railroads from place to place and to exercise the power of eminent domain. Again, the company had the competition of steam roads, and if the principle for which the village contended were adopted it might be compelled to stop at so many street crossings as to seriously hamper, and possibly destroy, its competitive power.

GUTTER CULVERTS

Box Culverts at Chattanooga—Details of Castings and Construction—Use of Vitrified Clay Pipe—Cast-Iron Water Pipe—Brick Arch Culvert—Plane Street Intersections

The gutter culverts of Memphis, Tenn., were described in a recent number of this journal, and are perhaps the most elaborate, if not the most expensive, of any to be found in this country. Other cities have used the rectangular culvert with the iron cover plate, but in most of them these plates are made narrower than 5 feet, and consequently their weight is much less. A common tendency, however, is to make the plates too light, which results not only in their breaking under unusually heavy loads, but occasionally also in their being jarred out of position, one edge falling into the culvert and thus forming a bad trap for horses, and even for wheels. The city engineer of Memphis has called attention to the fact that it would be fully as cheap, if not cheaper, to install a system of storm sewers than to use the iron-covered culverts of 3 to 4 feet diameter.

In Chattanooga, Tenn., gutter culverts covered with iron plates are used in a great many cases, but the culverts are made much smaller than those in Memphis. In many of them the concrete culvert is lined with a trough of cast-iron and the bottom is concaved with a radius of about 24 inches. In others the foundation is made of concrete and lined with 1 inch of cement mortar mixed 1 to 1½, the sides being composed of granite curbing 5 by 18 inches, set vertically in the concrete foundation and having its top inside corners cut away to receive the cover plate. When either concrete or stone curbing is used for the sides of the culvert one of these serves as the regular curb to the sidewalk at that point. As shown in the accompanying illustrations, the iron troughs are made in sections, either 3, 4 or 4½ feet long, the clear inside width is 19 inches, and the top is provided with a heavy rim on each side to receive the cover plate, which is 21 inches wide and made in the same lengths as the troughs. The plans shown herewith give the various dimensions of these castings. It is seen that the culvert plate averages about ¼-inch thick, and, accordingly, would weigh approximately 10 or 12 pounds per square foot, or about

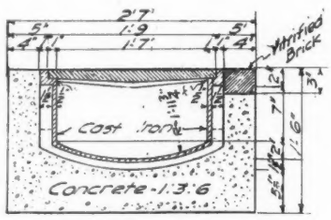


FIG. 2—SECTIONS CC AND EE (EE without brick)

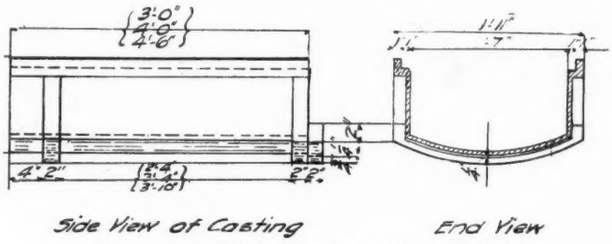


FIG. 3—TROUGH CASTING FOR GUTTER CULVERT

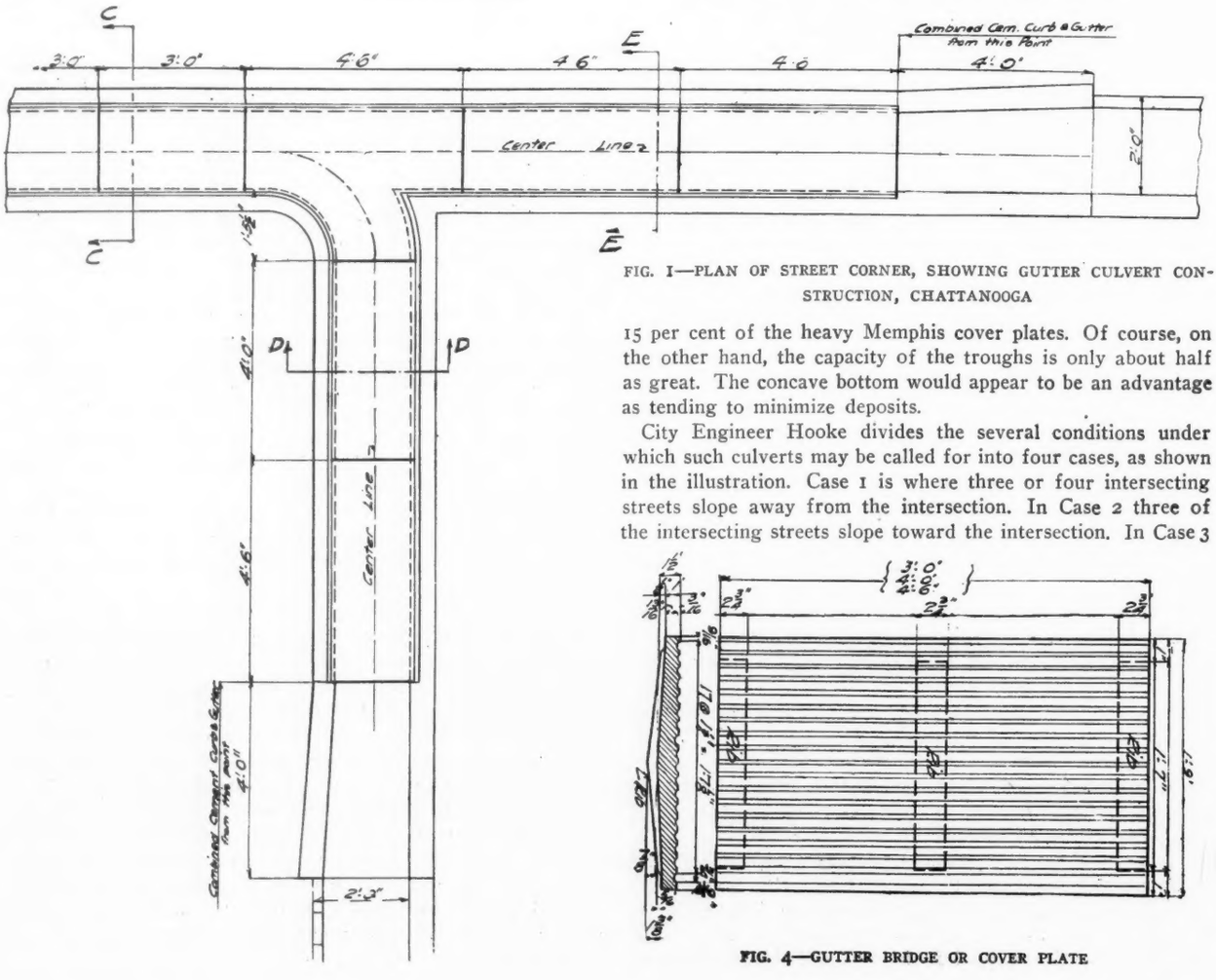


FIG. 1—PLAN OF STREET CORNER, SHOWING GUTTER CULVERT CONSTRUCTION, CHATTANOOGA

15 per cent of the heavy Memphis cover plates. Of course, on the other hand, the capacity of the troughs is only about half as great. The concave bottom would appear to be an advantage as tending to minimize deposits.

City Engineer Hooke divides the several conditions under which such culverts may be called for into four cases, as shown in the illustration. Case 1 is where three or four intersecting streets slope away from the intersection. In Case 2 three of the intersecting streets slope toward the intersection. In Case 3

FIG. 4—GUTTER BRIDGE OR COVER PLATE

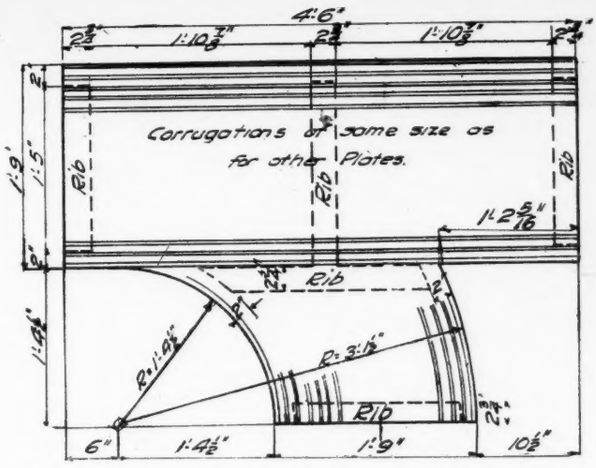


FIG. 5—DETAILS OF CORNER PLATE, MADE IN LEFTS AND RIGHTS

each street continues to slope in the same direction on each side of the crossing, and the culvert is placed on one side of the street only. In Case 4 there seems to be a special reason for using two culverts instead of allowing the drainage to turn the corner from one street into the other. In Case 1 two straight culverts are called for. In Case 2 each of the culverts receives two branch culverts; in Case 3 there is one straight culvert with two branches, and in Case 4 the same, with an additional straight culvert without branches. It is seen that each case requires for construction sections of straight culvert and either right-hand or left-hand branch castings. The general construction of a culvert with a branch is shown in Fig. 1, and the details of such branch are shown in Fig. 5. Aside from these, no special castings are called for except where the intersecting streets are not at right angles, or where the length between curbs is not an even number of feet.

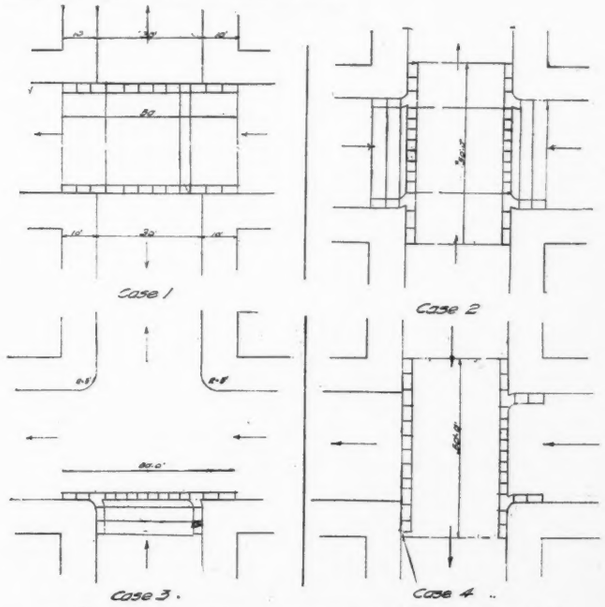


FIG. 6—VARIOUS CASES OF GUTTER CULVERTS, CHATTANOOGA

In many cities pipes are used instead of the rectangular culverts. They are less expensive, although they cannot readily be used for very large quantities of water, at least on flat grades. The sizes of pipe ordinarily used are 8, 10 and 12 inches, and the material either vitrified pipe or cast-iron. We have seen wrought-iron pipe used, but it lacks sufficient rigidity and durability. Cast-iron should always be used where there is a minimum of covering, as any weaker material would be broken by the passing loads. Vitrified pipe has been used, however, where a culvert depth of 12 to 18 inches may be obtained. Two of the accompanying illustrations show such cases, one of these an 8-inch pipe with about a 5-inch covering, the other a 10-inch pipe

FIG. 7—VITRIFIED PIPE CULVERTS, STRAIGHT AND DIAGONAL

with a 6-inch covering. These have been in place for a number of years under well traveled streets, and the same construction has been used in a considerable number of cities with very few instances of failure from crushing. Any tendency to such failure would probably be entirely forestalled by filling concrete between the sides of the trench and the outside of the pipe up to the level of its upper surface. In Fig. 10 is seen a cast-iron water pipe 10 inches in diameter, which protrudes above the street surface throughout its entire length, the bell at the joints between the two lengths sticking up fully 3 inches above the roadway level. Such constructions as this are frequently referred to as objections to the use of pipe for this purpose, but there is no good reason why in this case—and almost any other—the pipe should not be lowered 4 to 5 inches and thus allow 2 or 3 inches of macadam to be carried over the top of it. It is seen in the illustration that the pipe rises above the level of the gutter bridge in front of this outlet, and consequently this bridge would probably be flooded if the pipe were flowing approximately full.

It is frequently offered as objection to such a construction that, with 6-inch curbs, a 10-inch pipe with a 3-inch covering

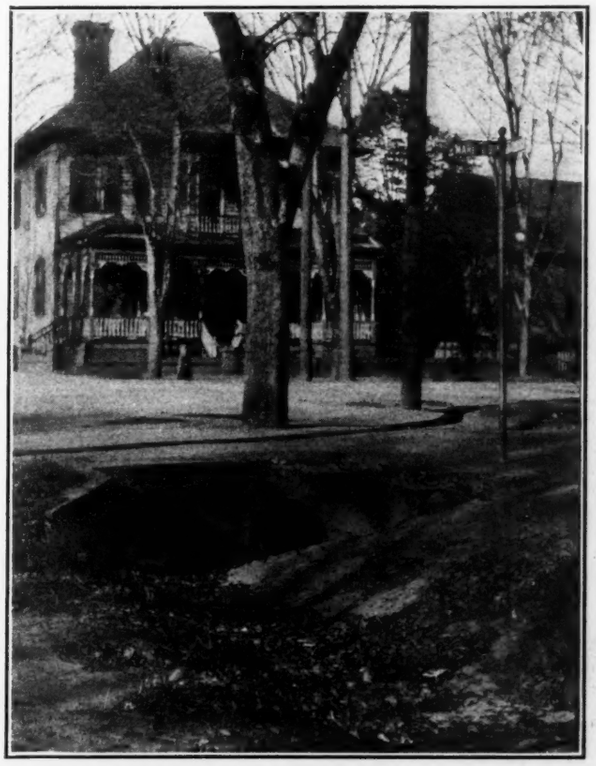


FIG. 8—JUNCTION OF VITRIFIED PIPE CULVERTS, COLUMBIA, S. C.

would bring the bottom of the pipe 6 or 8 inches below the ordinary gutter level. This is not a serious objection at the inlet end, as it merely means a rapid deepening of the gutter for 2 or 3 feet above the end of the pipe. The end of the pipe may

FIG. 9—BRICK CROSSING CULVERT, COLUMBIA, S. C.

then, however, offer a dangerous obstruction to vehicles turning a short corner; but this may be avoided, if necessary, by carrying the pipe several feet beyond the curb intersection. In fact, if carried across a considerable part of the sidewalk space, a gutter bridge may be formed by leveling up around the pipe with concrete. The chief objection to this is that the greater length increases the difficulty of cleaning the pipe in case of stoppage caused by dirt or by freezing. A more common method is to continue an open culvert above and below the ends of the pipe by setting a piece of curbing parallel to the curb and a foot or 15 inches away from it.

We still, however, have the lower end of the pipe to deal with. If the grade of the street running parallel with the pipe is at all steep it is usually sufficient to carry the gutter nearly level from the lower end of the pipe until the falling grade of the curbstone brings its height above the gutter to that desired—say, 6 inches. If the grade of the street is flat, however, an open culvert may be constructed by use of a length of curbing as described above, and the bottom of the gutter for 3 or 4 feet below the pipe be sloped up to the ordinary gutter level and paved with concrete. This forms a pocket, it is true, in which water will stand after each rain until it soaks away or evaporates, and in which heavy dirt will settle. With an upward slope of only 4 or 5 inches in as many feet, however, it will not take a very considerable volume of water to carry this dirt up into the gutter; and at the worst it will mean having one of the street force hoe it out after each storm. There will, however, be few cases where the grade of the street and gutter will not be sufficient to make this construction unnecessary.

Another method of treating the ends of the pipe culvert is to carry it completely across the sidewalk, as just suggested, and build brick or concrete walls across it just back of its ends; these walls serving also to retain gravel or other material, by which the sidewalk may be carried across the gutter and street without any appreciable departure from a uniform plane. Such construction is shown in Figs. 7 and 8. Where this construction is used at all four corners of an intersection, the entire intersection between property line corners may be made practically one plane. The lack of curb for keeping teams from encroaching upon the sidewalk at the corner is rendered unnnecessary by the wall at the end of the culvert, especially if a shade tree be planted at approximately the intersections of the curb lines.

In Fig. 9 is seen still another form of gutter culvert, this being a brick arch 4 inches thick and quite flat, the bottom of the culvert being an inverted arch also of brick. These have considerable more capacity than an 8 or 10-inch pipe, but probably not more than two such pipes; and the flat brick arch has not sufficient strength for carrying very heavy loads. The use of these is not very common except for carrying private driveways over gutters.

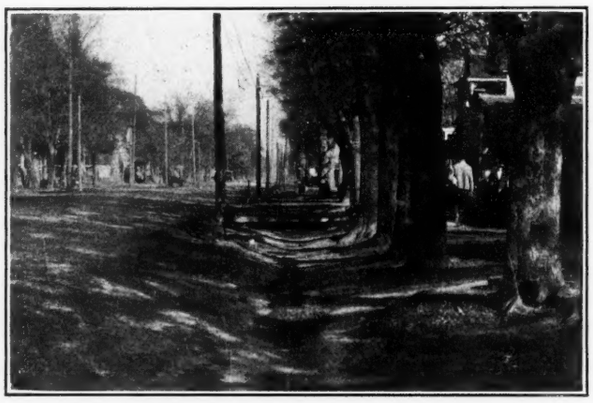


FIG. 11—DEEP, WIDE GUTTER, WITH BRIDGES, IN RED CLAY COUNTRY

Somewhat connected with the subject of gutter culverts is that of the wide and deep gutters found in a number of cities. Most streets where these are found are, or recently have been, of natural soil, or if macadamized at all this improvement has been confined to a central strip in a wide roadway. Under these conditions a comparatively deep gutter is desirable for drainage. Some soil washes very readily and any attempt to confine street wash in narrow gutters would prove more or less

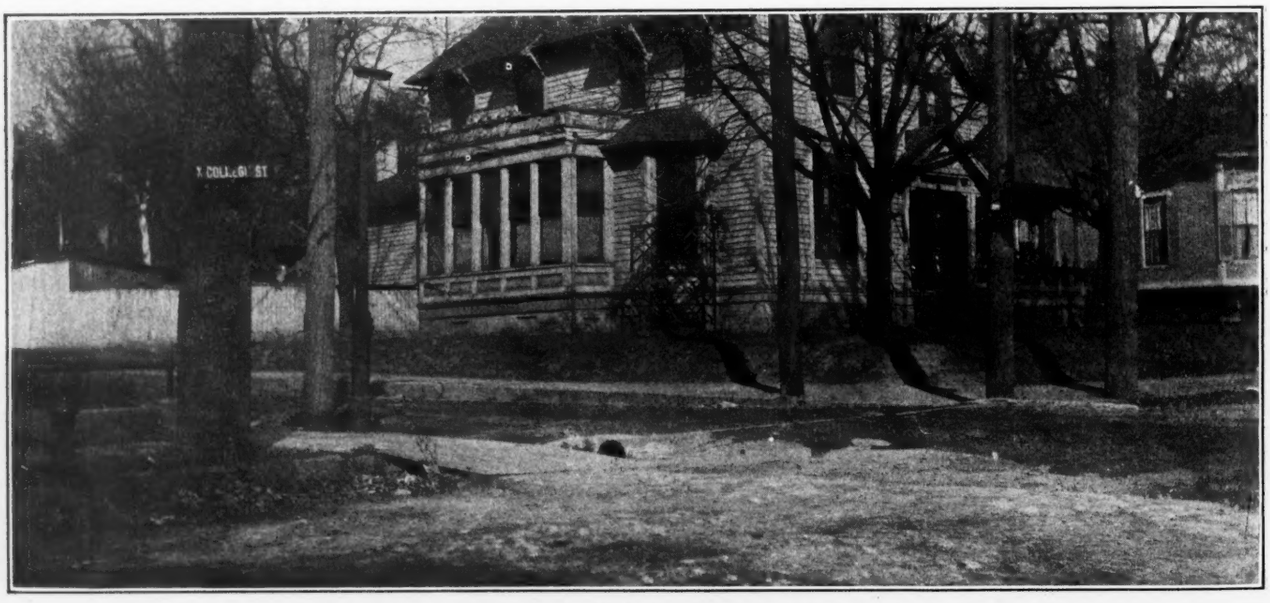


FIG. 10—CAST-IRON WATER PIPE CULVERT, ABOUT SIX INCHES TOO HIGH
Also fire hydrant, unused lamp post, hitching post, and electric light and four telephone posts

disastrous to the adjacent roadway and sidewalk. In fact, it is not unusual to see, in outlying streets, gutters two or three and even five or six feet deep washed into such clay soils by concentrated flow on rather steep grades. Under such conditions wide gutters would seem to be necessary until such time as the city can afford to pave the entire street and also the gutter; but then shallower, narrower gutters should be constructed.

DAMAGES BY ELECTROLYSIS

What European Cities Do to Prevent Losses—Use of Rail for Return Circuit—Connecting Rails to Pipes —Permissible Drop in Potential

THE municipal engineers of several American cities have been seeking information for the prevention of electrolytic damage to pipes and other metallic substructures. To this end Mr. E. N. Lake, chairman of the electrolysis subcommittee in Chicago, submitted through the Bureau of Manufactures the following four questions for investigation by American consular officers in ten of the largest European cities:

The use of track rails for the electrical return circuit of street railway lines.

The permissible drop in potential over the return circuits of street railway lines.

The maximum difference in potential between track rails used as return circuits and gas pipes, water pipes or other metallic substructures contiguous to the track.

Regulations or practices with reference to electrically connecting track rails to gas mains, water pipes or other metallic substructures.

Mr. Lake made a thorough study of the responsive consular reports, and furnishes the following résumé (the detailed reports being available for consultation at the Bureau of Manufactures):

In answer to the first question, rails are used in all the cities named for return circuit. The summary of answers to the other questions are given in the accompanying table.

CITY	Permissible Drop in Potential Over Street Railway Return Circuits	Potential Difference between Track Rails and Contiguous Pipes	Electrical Connections between Negative Return and Contiguous Pipes
London	7 volts, maximum drop	Pipes, +1.4 volts; pipes, −4.2 volts	Permitted under special regulation.
Paris	1 volt per kilometer; 5 volts maximum	Average of 1 volt normal operation	No information.
Berlin	No specific regulation	No specific regulation	Not permitted.
Vienna	5 to 7 volts at maximum traffic	Maximum observed, 1 volt	None used.
St. Petersburg	1.5 volts maximum in city; 3 volts maximum in suburbs.	No regulation	Not permitted.
Moscow	Maximum 1.5 volts in city; 3 volts in country.	No regulation	Not used.
Glasgow	7 volts, maximum drop	Maximum observed, less than 1 volt	Permitted, but not practiced.
Liverpool	7 volts, maximum drop	Maximum, 4.5 volts	None used.
Brussels	No specific regulation	No specific regulation	None used.
Christiania	Maximum drop about 10 volts	Maximum about 5 volts	No information.

The following additional notes taken from the letters and regulations received, while not bearing directly upon the four main queries, will be of interest in considering the general question of electrolysis.

SOME ADDITIONAL NOTES

London.—Return feeders may be uninsulated within 3 feet of the track rails and electrically connected thereto at intervals of not more than 100 feet, otherwise they must be insulated unless they are of such sectional area that they will reduce the difference of potential between the ends of the uninsulated parts of the return below the maximum limit of 7 volts.

If any part of the return circuit is uinsulated it must be connected with the negative terminal of the generator and the negative of the generator must also be grounded through an ammeter to two separate earth connections, one of which may be a water main.

Paris.—When electrical installations are in public highways or are for electric railways applications for permits must contain complete information and specifications as to the proposed installation. These are passed upon by the several departments, and when permits are issued provision is made for close supervision of the governmental department interested.

A three-wire system at 1,200 volts between trolley wires may be used, provided the track rails are used as the neutral conductor.

The resistance of a rail joint where the track is used for return circuit, must not be greater than that of 10 meters (32.8 feet) of unjointed rail.

Berlin.—Grounding of rails to earth or to pipes is not permitted, and artificial earth plates are prohibited.

The city exercises a supervision over the matter of potential differences in the earth through the jurisdiction of the city official engineers.

No specific potential differences or potential drops are mentioned in the requirements, but power is reserved by the city to investigate and prescribe in accordance with the conditions applying to each individual case.

Vienna.—The license regulations of the Austrian railway ministry provide for supervision of the return circuit conditions in a manner similar to that noted with reference to Berlin, except that in Vienna there is a municipal street railway system.

A periodical examination is made by means of a test car of the electrical condition of track joints and return circuits.

St. Petersburg.—Maximum potential drop in return circuits was originally specified as 5 volts per verst in suburbs and 2½ volts in city. This is equal to about 7.5 volts and 3¾ volts per mile, respectively.

This is now 3 volts and 1½ volts maximum between any two points on the system.

Moscow.—Equalizing rheostats are used in the negative return cables.

Underground pipe systems are divided into sections by insulating joints.

Glasgow.—The Glasgow authorities consider the board of trade regulation of seven volts maximum drop between any two points of the return circuit as far too high, and have limited their drop to 2 and 3 volts.

The lead sheaths of their own cables are connected by the tramway department to the track rails at every manhole or at an average interval of about 350 feet.

Liverpool.—Board of trade regulations apply and are the same as in London.

Brussels.—There is only a general regulation without specific requirements as to potential differences or drops, which provides that the electrical conductivity of the return shall be such as to avoid all harmful "electrolytic actions."

Christiania.—In addition to the bonded rails for the return circuit an auxiliary copper conductor, about No. 8 B. & S. gauge, is soldered to the bonds at each rail joint.

PROTECTING CONCRETE FROM ACID

QUITE a little interest has been shown by technical papers, especially those devoted to cement, in experiences recently reported from France in the use of cement tanks for holding wine. These began to take the place of wooden tanks some years ago, being found cheaper. It has been discovered, however, that the acid in the wine very often decomposes the cement, and also the cement absorbs certain elements of the wine. This objection was a serious one, but has been met by coating the walls with squares of glass tile joined with cement; this particular cement being protected from acid attack by a tartar which forms on it. This construction also permits concrete tanks to be used for the storage of oils, gasoline, kerosene, turpentine, etc.

The interest to municipal authorities in this matter lies in the possible analogy between the effect of wine and that of acid sewage upon concrete. It is, of course, unquestioned that strong acids attack concrete, but the amount of acid in wine is perhaps no greater than that in some sewages. The absorption of certain elements from the wine, also, is of interest for the same reason.

ST. MARYS WATER AND LIGHT PLANT

The successful operation of the municipally owned water works and lighting plants in cities throughout the Central West has given a strong impetus to improvements of this kind. Over forty municipal water works plants (many of these being combined water and lighting plants) have been installed in Oklahoma in 1909, and during the same year Kansas installed thirty-four municipal plants, most of them being combined water and lighting plants. The Kansas State law permitting the State school fund to purchase municipal bonds has caused a ready home market for most of these bonds.

Among the recently constructed water and light plants is that at St. Marys, Kansas. Before submitting to the people the question of bonds for this plant, the City Council had a preliminary survey, estimates of cost, and an investigation of the water supply made, which enabled the proposition to be intelligently understood by the voters and resulted in an almost unanimous vote for the bonds. After this, final plans and specifications were prepared by the engineers, and, in order that the best rating of fire insurance could be secured, the plans were submitted to the State Board of Fire Underwriters at Topeka, Kan., for their suggestions and recommendations, which were complied with. The plans were next submitted to the State Board of Health for their approval, as required by the State law. This provision of the Kansas water and sewerage law is a safeguard for the cities of Kansas, as the sanitary features of a plant are carefully considered and any possible pollution or future contamination of a water supply is guarded against. After final aproval of all the plans, sealed bids were advertised for on all the material, equipment, and the construction work, separate bids being received for each class of material. The city received a total of sixty-two sealed bids for the work and awards were speedily made at prices well within the estimates.

The water supply is taken from wells west of the city and away from the drainage of the town. The wells are about forty feet deep, three in number, and connected together by a brick tunnel containing the main suction pipe, which leads to two horizontal, compound, duplex pumps located in a brick pump pit. The interior of this pit is shown at the left side of the illustration, connected with the dynamo room by a large arched doorway.

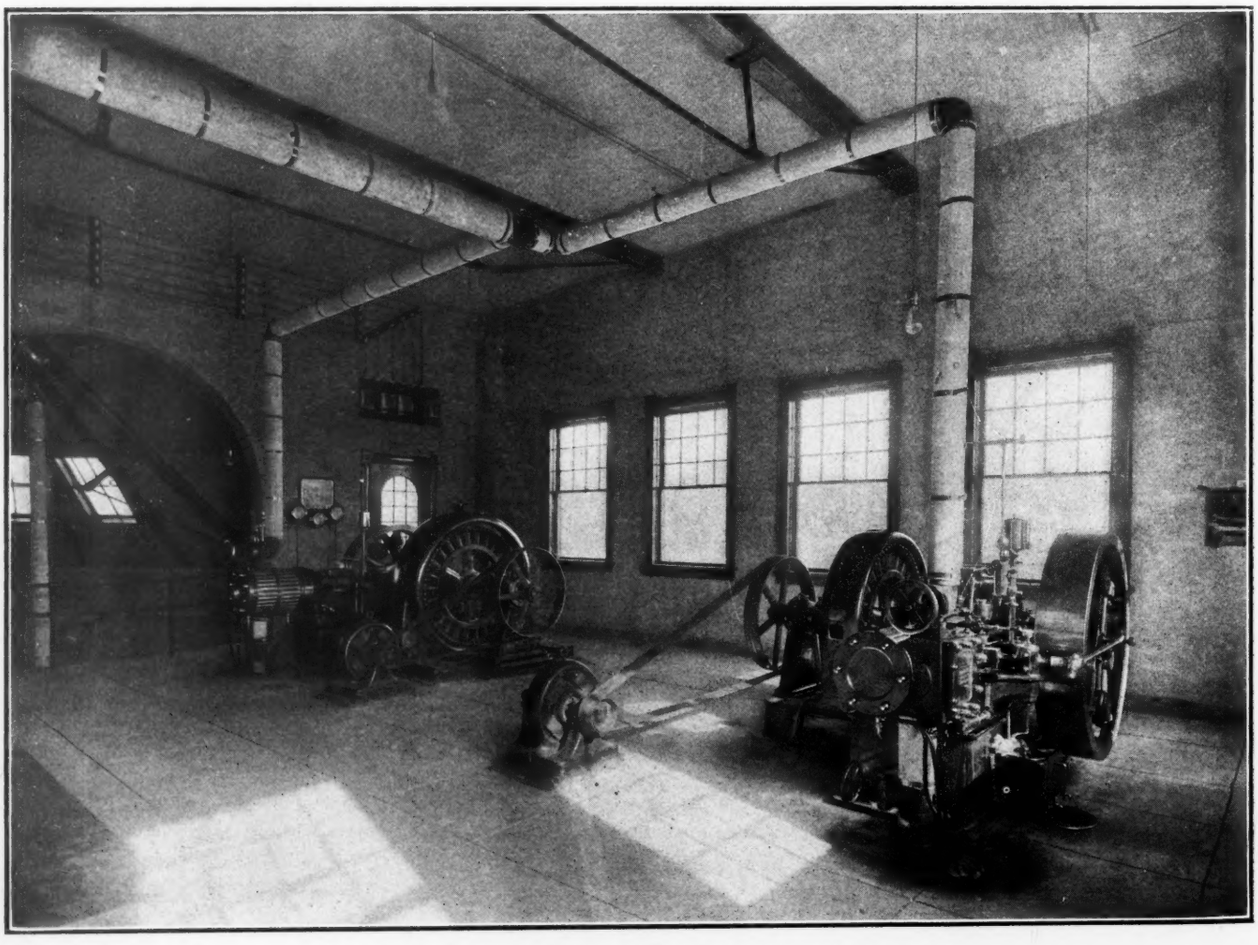
The power plant uses fuel oil in generating steam, thus doing away with the inconvenience and expense of handling coal. The fuel oil is furnished at 1⅞ cents per gallon in car-load lots, delivered into the city's storage tank of two cars capacity. The simplicity of the plant and its ease of operation appeal to towns which have had difficulty in securing competent operating engineers.

The machinery for both the lighting plant and the water works are in duplicate. The units are direct connected, occupying a small space and located in a separate room from the boilers. Series tungsten lamps are used for street lighting. The experience with the tungsten lamps is that the consumer gets three times as much light for the same money as he is paying for the common incandescent lamp, or the same light for one-third the cost. The light is pure white instead of yellow.

As the engineers and City Council believed that a power house appeals to the citizens as a visible return for their investment, a special effort was made to secure an attractive looking power house, both in the exterior and interior finish.

The distribution system of cast-iron mains covers the city thoroughly. Domestic and fire pressure are secured from an elevated storage tank and from direct pressure respectively.

The general contractor for the work was W. W. Cook & Son, of Junction City, Kan. All the machinery and equipment were furnished by the Merkle Machinery Company, of Kansas City, Mo. The entire works were designed and supervised by Burns & McDonnell, Consulting Engineers, of Kansas City, Mo.



VIEW OF INTERIOR, ST. MARYS WATER AND LIGHT STATION

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JANUARY 5, 1910

CONTENTS

Iron Lime Coagulation at St. Louis (Illustrated) By Chas. Claude Casey..... 1
An Objectionable Manhole Head (Illustrated)..... 5
Depth of Water Pipe..... 6
Commission Government in Kansas..... 9
Street Lighting Rates..... 9
Concrete Paving at Memphis (Illustrated)..... 9
Regulation of Street Traffic..... 12
Tank Treatment of Sewage..... 14
City's Power Over Street Car Stops..... 15
Gutter Culverts (Illustrated)..... 16
Damage by Electrolysis..... 19
Protecting Concrete from Acid..... 19
St. Marys Water and Light Plant (Illustrated)..... 20
Automatic Water Purification..... 21
Street Signs and Corner Obstructions..... 21
Thawing Out Manhole Covers..... 21
News of the Municipalities (Illustrated)..... 22
Legal News—A Summary and Notes of Recent Decisions..... 29
News of the Societies..... 30
Personals..... 31
Incorporations..... 31
Municipal Appliances (Illustrated)..... 32
Trade Notes..... 33
The Municipal Index..... 34
Patent Claims (Illustrated)..... 50

Automatic Water Purification

PROBABLY all the other features connected with water and sewage purification plants tending to nulify good designing in producing desired results do not together militate so much against such result as does improper or insufficient attention to their operation. This is especially true of sewage purification plants, of which perhaps the majority are so neglected as to be working at very much less than their best practicable efficiency. In water works purification plants the tendency to neglect is not so great, but there can be no question that the cleaning of filter beds is too often deferred undesirably long; and when chemicals are added, their quantities are regulated too little by the varying requirements of the character of the raw water, in some plants the strength of the solution being determined solely by the amount which will be taken up by a stream of water flowing over or through the crystals or powder at a rate determined by chance or a crude guess.

The reason for this neglect is generally a desire to keep the maintenance expenses down; the cost of one efficient operator, in small plants especially, being a very considerable item. To meet this difficulty efforts have been made to introduce automatic appliances in both sewage and water purification plants, with more or less success. We believe there is no question that the plant at St. Louis described in this issue is the most elaborate attempt at obtaining automatic control which has yet been attempted. It will be seen to be quite elaborate and the expense far beyond what a small plant could afford. It is probable, however, that experience will suggest simplifications, and we hope that in time reliable automatic apparatus sufficiently simple and cheap for small plants will be developed.

Street Signs and Corner Obstructions

Two of the illustrations on page 17 show street signs, in each case of white and blue enamel, and in each case the enamel has been more or less broken. Such an examination as we have been able to make of these enamel signs leads us to believe that in many cases the steel plate which carries the enamel is too thin, since any bending of this plate cracks the enamel, which is quite brittle. The post carrying the sign, in Fig. 8, is very simple in construction, being merely a 2-inch galvanized wrought-iron pipe, capped with an iron casting which is tapped for horizontal ¾-inch rods, from which the sign plates are suspended. The casting is continued above the rods with a ball as a modest ornament. The whole is neat and not offensive to sight, and is inexpensive. We have seen these in several cities, and in one of them noticed a number which had been bent to an angle of 10 to 15 degrees with the vertical, probably by blows from wagons. It would seem desirable to place such light posts where they cannot be struck by wagons. An objection to these particular posts is that, where the ground is loosened around them somewhat, they can readily be turned around their axis with the hands and the signs thus made to point in the wrong direction. It should be easy, however, to attach a plate or cast arms to the bottom of the post so as to prevent this.

Fig. 10 is an illustration of an evil which has been generally recognized in our cities, but which, nevertheless, has been remedied in altogether too few cases. This is the bunching of obstructions of all kinds at street intersections, where they should logically be least in number if the effort be to interfere as little as possible with traffic. At this particular corner we notice four posts carrying telephone and telegraph wires, and a fifth carrying an electric light, an abandoned lamp post from which not even the dilapidated frame for the globe has been removed, a fire hydrant and a hitching post. It is possible that the city is unable to compel the various companies carrying wires through the streets to arrange for using only one or two lines of posts for this purpose, although we believe that a method could be found in almost any city to compel this for the public good. It hardly seems possible, however, that the city is not able to remove or compel the removal of the abandoned lamp posts, since gas is no longer used for street lighting in that city.

Thawing Out Manhole Covers

DURING freezing weather considerable trouble is frequently experienced in removing the covers to manholes, valve and meter boxes, and other openings in street or sidewalk surfaces. The ice around the edges of these, which is often the cause of the trouble, may be thawed quickly by pouring a little gasoline around the edge and instantly lighting the same. Kerosene might be used, but does not light so easily or burn so freely. Thawing fire hydrants by burning oil in them has been practiced, but can not be recommended as it may damage valve stems, or rubbers, or other parts.

NEWS OF THE MUNICIPALITIES

Current Subjects of General Interest, Under Consideration by City Councils and Department Heads—Streets, Water Works, Lighting and Sanitary Matters—Police and Fire Items—Government and Finance

ROADS AND PAVEMENTS

Good Cement Sidewalk Record

Augusta, Ga.—Twice as much cement sidewalk has been laid in 1909 as the year before, a reduction in price having something to do with the increase. The total was 110,979 square yards, as compared with 59,836 for the year before. The property owners pay the whole cost, but the city carries them for three years. Sidewalks were laid on nineteen streets, and at the same rate of progress ten years would be required to pave the whole city.

City Would Compromise Grantees for Money Consideration

Dallas, Tex.—Notice has been given the Board of Municipal Commissioners by the Barber Asphalt Paving Company that a special agent is to be sent to the city to investigate the consideration of the city's offer to take over Elm street paving maintenance. The city, desiring to narrow the street and widen the walks and to pave with some other material than asphalt, has offered to release the company upon a cash payment of $20,000. The $20,000 is to be used in the new paving proposition. The question arose and is being discussed, What division ought to be made of the money so received, if it is received, whether any part of it is to be allowed to the property owners on the new paving contract or whether it will be applied to the city's part of such an undertaking?

Citizens' Committee on Sidewalks

Harrisburg, Pa.—A committee that will confer with Councils and the Executive Department relative to taking steps to improve the paved streets and sidewalks of Harrisburg has been announced by the Board of Trade and a plan of campaign will be made. The committee is as follows: John S. Sible, Chairman; Robert W. Dunlop, Roy G. Cox, W. R. Harrar, Samuel Rambo, John P. Gohl, Charles P. Walter, J. H. Musser, George W. McIlhenny.

Traffic Rules Inaugurated in Pittsburg

Pittsburg, Pa.—The Public Safety Department's street traffic regulation scheme were given a trial January 3, the first Monday of the New Year. On that day vehicles, including street cars, were directed to travel northward only in Smithfield street and southward only in Wood street. Director John M. Morin said the rest of the downtown streets may be subjected to the regulations, but this has not been fully decided. The street cars were ordered included in the regulations following a conference between Mayor William A. Magee, President J. Dawson Callery of the Pittsburg Railways Company, Expert John P. Fox and Expert Emil Swensson. Making Smithfield a north traffic street will result in every alternate parallel thoroughfare becoming a north traffic street, and every alternate parallel thoroughfare from Wood street will be a south traffic street. It is Director Morin's intention to prohibit vehicle traffic, exclusive of street cars, in downtown Fifth avenue during busy hours. An ordinance authorizing the Director to make these regulations has passed Councils and been signed by the Mayor.

Fine Piece of Road Finished

Rockville, Md.—Another section of fine roadway has just been completed in Montgomery county. It is the new Shoemaker pike from Kensington to Chevy Chase, a distance of about three and a half miles, and is said to be one of the finest pieces of road in Maryland. It cost more than $30,000, one-half of which amount was furnished by the State under the provisions of the Shoemaker law and the other half was raised by a bond issue by the county and a liberal contribution by the Chevy Chase Land Company. The new road connects at Chevy Chase with a splendid macadam highway leading into Washington, making a continuous high-class thoroughfare from Kensington to the National Capital, a distance of about seven and a half miles.

Birmingham Doing Its Own Paving

Birmingham, Ala.—The city is now embarking upon a policy of doing its own work which is already in vogue in many cities, and is proving satisfactory to city officials. Everything is being done, however, under contract, the city bidding against outside contractors, and only taking the amount of work which it is capable of handling with its convicts. Thus far none of the work undertaken by the city has been completed, but Mayor O'Brien is highly pleased with its progress, and the saving which results to the property owners. It is becoming so popular with the citizens that a committee from one residence section, headed by Paschal Shook, has waited on the Mayor and requested that the city authorities do the paving on their streets, and insisting that the contract be awarded to the city instead of outside contractors. The work being done by the city at 48 cents a square yard is an asphalt oil macadam, under specifications drawn in the city department, and held above the 20 per cent void in order to avoid infringement of Warren Bros.' patent. A proposition to purchase a railroad asphalt plant is being favorably considered.

Wanted—A Docile Road Roller

Winchester, Va.—A large traction engine and a twenty-ton roller used by the State Highway Commissioner in making new roads west of Winchester became unmanageable, a few days ago, while being operated on a narrow road near Chambersville and plunged down a deep ravine, carrying with it a mass of stone, dirt and small trees. Calvin Ramey, who was on the engine at the time, had a narrow escape from being crushed to death, but saved himself by leaping across the ravine. The two ponderous machines were wrecked.

Akron Paving Record

Akron, O.—Eleven miles of streets have been paved this year as compared with five and a half miles in 1908. There are now 53 miles of paved streets in the city and three miles under way.

City Lays Forty-eight Miles of Sidewalk

Toledo, O.—Forty-eight miles of sidewalks, about half flag and half concrete, on 190 streets have been laid by private parties and the city contractors during this season. Last year but 30¼ miles were laid. Sidewalk Inspector Henry Hune has finished his work for the season. His records show that $131,250 has been spent by the city and citizens for new walks. A total of $70,000 has been spent by the city direct, and about $61,000 in sidewalk work has been delegated to contractors. For the city work 265 cars of stone flagging was used. The work was carried on systematically by the division of the city into three districts, with two city contractors working in each district. There were 2400 permits issued to citizens who desired to let their own sidewalk contracts. During the year past 8½ miles of bad walks were torn up to prevent damage suits against the city.

Wisconsin Good Roads Bill Prepared

Madison, Wis.—A good roads bill being prepared by a special committee on good roads of the Wisconsin Legislature will recommend that the cost of building certain highways in the State (main roads of traffic) be divided between the State, county, and town, each paying about one-third of the cost. The exact cost to the county, the bill provides, should depend in a small measure upon its valuation. A sliding scale from 33 1/3 per cent is provided in the bill for use in some instances. The bill provides that all road building, the management, inspection and repairing of roads, be left entirely with the local authorities. As a special recommendation, aside from the bill, the committee will suggest that the license fee on automobiles be increased, and that out of the fund thus created a part of the cost of road building be carried.

SEWERAGE AND SANITATION

Sanitary Sunday Plan Favored in Carolinas

Asheville, N. C.—Dr. Dunn, president of the North Carolina Association for the Prevention of Tuberculosis, is carrying on a campaign for a "Sanitary Sunday" and is meeting with favorable replies to nearly all the letters he has sent out. The idea is to fix on a certain Sunday and have the ministers all speak on the subject of sanitation and tuberculosis.

City Assumes Charge of Tuberculosis Work

Baltimore, Md.—On January 1 the city took over the tuberculosis work of Baltimore, which has been in the hands of the Instructive Visiting Nurses' Association for five years, and begun an active campaign to reduce the number of cases in the city to a minimum. The Board of Estimate made provision for the employment of 15 nurses for this work, and these will be under the direction of the Health Department in a special division to be known as the tuberculosis division.

Sluice Gates Are Not Used

Hoboken, N. J.—Mayor George Gonzales, for several weeks before taking office, when still a member of the Common Council, investigated sewerage conditions and reported to Council that he had visited the tidal sluice gates of the main sewers and found only one of the four in perfect working order. This, notwithstanding the fact that two gatekeepers are employed. Mr. Gonzales saw water coming up through the manholes in the lower section of the city as the tide rose. Councilman Buckley declared that a pumping plant was the only solution of Hoboken's sewerage problem.

Typhoid Due to Unsanitary Household Conditions

Lowell, Mass.—Agent Bates has reported five cases of typhoid fever in one house in Cherry street. He said that one milkman supplied all of the families that were stricken and the first thought of himself and his inspectors was that the milkman was responsible. The milkman's premises were inspected and everything was found to be all right. Then the house was inspected and the inspectors satisfied themselves that the infection came from the house. The families are foreigners and do not seem to understand what is necessary for them to do in order to guard against the spread of the disease. Inspector O'Hare, who is acting as secretary for the board, said that he visited the house where typhoid is raging. He took with him an interpreter and he said it was hard to make them understand.

WATER SUPPLY

Cannot Compete With Bad City Water

Burlington, N. J.—The city is in the anomalous position of supplying the citizens with water that looks like poorly diluted ink, while proceeding against a poor colored woman who has been selling water from her well to residents of the vicinity, not only for drinking, but for washing purposes. The city, through the Health Board, has condemned the well of Mrs. Temperance Miller as unhealthy, and the contention has been going on for several months. Now the situation has reached a crisis, for the owner of the well has been summoned to appear before Magistrate Smith to answer the Board's charge. Mrs. Miller declares she will go to jail before she will close the well, and she is getting the support of many of the residents of the city, who find it impossible to use the stuff pumped into the city mains from the Delaware River.

Trenton Must Purify Water

Trenton, N. J.—The State Board of Health has served a notice on Mayor Madden and the Common Council to show cause why the Board should not apply to the courts for an injunction to restrain the city from delivering polluted and contaminated water to the citizens of Trenton. This action was based on analyses made in the State laboratory showing that the water was bacteriologically in worse condition than ever before. The bad color of the water is due to carbon in the water, which constitutes 50 per cent of the suspended matter.

Borough Water Shut Off by Railroad

Coatesville, Pa.—The Pennsylvania Railroad Company has taken out the water meter by means of which their water supply was connected with that of the Borough, thus cutting off the replenishing of the town's supply. This makes the water problem more serious, as it was only a few weeks ago that the Borough officials had to use the Pennsylvania supply to fill the reservoir in order to adequately supply the town. Prior to a recent rain the water in Sucker Run was extremely low, and the gravity dam filled up so slowly that nearly a week was consumed in getting it filled again to its capacity. The water in the reservoir has fallen to the seven-foot mark. The big basin is thirteen feet deep, but its sides slope to such an extent that when there are but seven feet of water in it, it is only about one-third full.

Collingswood Keeps Up Water Fight

Collingswood, N. J.—The advocates of a municipal water plant in Collingswood have girded their loins for a renewed fight to install a plant under the control of the borough and free of the corporations, which, it is claimed, have been unable so far to furnish good water. The Citizens' League has issued a circular to the property owners, a majority of whom had signed the remonstrance against the proposed bond issue for installation of the plant, declaring that gross misrepresentation had been resorted to in the scheme to defeat the plans. They are appealing to the signers to sign withdrawals, so that there may be some chance of getting the question of the bond issue before the people to vote. They claim that the history of all local plants shows that they pay, and pay handsomely, and there is no reason, except the influences of the dominating political corporation influences, why Collingswood should not have its own plant. Among other things the circular says:

It is the duty of every honest home-loving citizen to watch their every move and protect your friends and neighbors, especially women who own property, from falling into their hands, and if you hear of any friends that have been misinformed and induced to sign their remonstrance go to them, and let them know the truth at once, so they may sign a withdrawal blank and keep on the side of the people.

If you have been induced to sign a remonstrance sign a withdrawal and get straight with your friends and neighbors.

The proposed new private water company is only a cloak to cover the four old companies, who will get practically all your money, and every new company added means more expense, more water rent (and water rent is taxes).

Send in wtihdrawals at once, every day counts, that they may never succeed in forcing us back into the hands of the old water companies, back with the same old horrible conditions.

Don't be fooled by smooth promises and a $10,000 guaranteed check. Their check has no value as a guarantee, but is a gross deception—and can be withdrawn any time.

There has been a clear division of sentiment among the citizens and property owners of the borough in this long and furious water battle, and the opponents of the proposed municipal plant have presented the argument, so convincing to many taxpayers, that the present tax rate, already high, will be greatly advanced. They have had the opinions of experts that not all municipally-owned plants pay, but in many instances are run at great loss, and they say that the proposed new company will be able to furnish an adequate supply of the best-quality water.

Big Water Leak Found

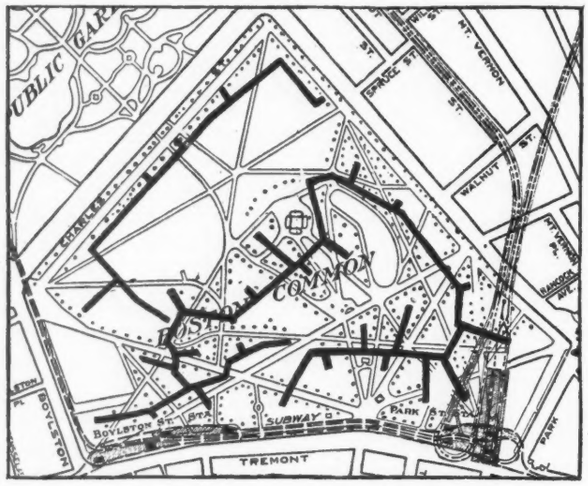
East Newark, N. J.—A leak which allowed a waste of 200,000 gallons of water a day has been discovered by Richard Veale, of Arlington, Superintendent for the Suburban Water Company. It was found at the mills of the Clark Mile End Thread Works, in East Newark, in the automatic fire sprinkling system. The Clark company's contract with the Suburban Water Company provides that the waste on the thread mill grounds shall be paid for.

Break in Main Endangers City

Peoria, Ill.—A sixteen-inch water main broke at Spring and Adams street, December 22. The city was without adequate fire protection for three hours and the Peoria Street Railway Company and the Rock Island and Peoria steam railway were blocked. A fire occurred only a few minutes after the brake was repaired. The break occurred in a T from a 30-inch to a 16-inch main. The entire bottom of the pipe dropped off.

Installing Water System in Boston Common

Boston, Mass.—The work of installing the new irrigation system for the Common has begun. It is expected that, with favorable weather, the pipes will have been laid by February 1. Many of the deep trenches have been dug, and the laying of pipes has already been started. The new system will provide for a large number of new hydrants.



NEW WATER DISTRIBUTION SYSTEM, BOSTON COMMON

These hydrants are not as large as those of the fire department, and when in place will not stand much more than a foot and a half above the ground level. The hydrants are so arranged that a line of hose 200 feet long will cover all the ground not within reach of the next nearest hydrant. The work is proceeding under the provision of the Parkman fund. In the past any very dry spell in the summer has been the means of killing the grass in almost every part of the Common, but with the new system working it is expected that this will be prevented.

Water Meters Cause Row in Works Board

Vallejo, Cal.—The idea of Commissioner of Public Works O. S. Cooper that the Trident water meters should be purchased for this city because they had proved satisfactory in the past caused a lively passage-at-arms between him and Frank Otis, representative of one of the other five bidders, when the matter came up at the meeting of the Board of Public Works recently. Otis claimed that the Board had no right to advertise for bids if it was determined to purchase the Trident meters regardless of any others which might be shown, or of lower figures at which others could be purchased. Mayor J. J. Madigan sided with Commissioner William Blake, and the matter was accordingly postponed to permit of an investigation being made of the relative merits of the several styles offered.

Springfield Gets New Water Supply

Springfield, Mass.—The new Little River water supply system, which cost about $2,000,000 to install, was turned on for the first time, and so great was the pressure of the water from the Provin Mountain reservoir that it forced the old water in the mains back into the Ludlow reservoir, 10 miles away, and filled up the lower basin at the old works, which had been empty since early in the fall. The pressure in this city was increased from 95 pounds to 140 pounds within a few minutes after the gates letting in the new water were opened.

New Water System in Service

Parsons, W. Va.—Parsons has just put into service its new water system, which consists of six miles of pipe lines, 47 fire hydrants and a 600,000-gallon reinforced concrete reservoir.

Galesburg Out of Water

Galesburg, Ill.—When the new Columbus pump was installed at the city water plant, city officials thought the danger of a water famine was all over. After a few days, however, the air lift broke down, but the pump did the work. Then the new pump broke down—there was no supply on hand for the city. Arrangements were made with the Burlington railway to furnish water in case of fire.

STREET LIGHTING AND POWER

City to Buy Gas and Electric Light Plants

Haverhill, Mass.—The Municipal Council has unanimously passed four orders for the purchase of the plants of the Haverhill Gas Company and the Haverhill Electric Company. Mayor Edwin H. Moulton, who is a staunch advocate of the proposition, intends to have similar orders passed early this month, there being no change in the personnel of the Municipal Council for the ensuing year. It is necessary, under the State law permitting municipalities to acquire control of lighting plants, for the question to be acted upon favorably two years in succession. After this action is taken Mayor Moulton proposes to issue a call for a special city election next February when the question will be submitted to the voters for acceptance. It is estimated that the acquirement of the two plants will involve an outlay of at least $1,500,000.

New Lights at Grand Forks

Grand Forks, N. D.—The entire new lighting system on DeMers avenue was placed in operation December 18. The remainder of the system on both North and South Third and Fourth streets, as well as Kittson avenue, was lighted on Christmas.

By the completion of the system last month the Electric Construction Company has made a record for fast work. The system has been under way of construction about seventy days, and, with the exception of a very small amount of work that cannot be done till warmer weather arrives, will be completed in less than eighty days. The City Council had specified 120 days as the time in which the system was to be in operation.

Ornamental Lighting Plan for Syracuse

Syracuse, N. Y.—General Manager James C. De Long, of the Syracuse Lighting Company, has inaugurated a campaign for ornamental street lights throughout the important business streets of Syracuse. Warren street between Washington and Jefferson streets will be the point first selected as a field for the innovation. Mr. De Long said that he would send out canvassers among the Warren street business men seeking to arrange to meet the expense of the ornamental lights by monthly payments of a certain sum a front foot. If the business men accede to the proposed plan Warren street soon will be ablaze from dusk to midnight with many ornamental lights set upon posts in clusters of five. The combined lighting capacity of each cluster will be 160 candlepower. The lights will be set at stated distances apart on each side of the street.

Find Natural Gas Mains in Bad Order

Topeka, Kan.—While hunting for leaks in the gas mains near Seventh and Jackson streets, employees of the Consumers' Light, Heat and Power Company found a three-inch main broken in two and gas escaping from it. In the same street many service pipes were found rotted out. The bad pipes are old mains made by the company manufacturing artificial gas many years ago. These mains were condemned and declared useless at the time the Consumers' company took them over.

Light and Water Plant Burned

Etna, Pa.—Fire destroyed the Etna water works and light plant, along the Allegheny River, near the Sharpsburg Bridge, near Pittsburg, recently, placed the borough streets in darkness and for a time deprived the people of water. It was a brick and frame structure 80 x 200 feet, and the damage will amount to about $100,000, which is covered by insurance. The plant was equipped with the latest and best machinery, all of which is now practically worthless. The light plant itself was valued at $35,000. For the time being the people of Etna will be supplied with water from the 16-inch water main which passes through the borough to the Northside water plant. They have a right to use this because of the provision in the ordinance which permits the main to pass through the borough. The people who were supplied with their electric lights from the light plant will have to rely entirely upon their gas supply for some months, at least. The fire will necessitate the erection of an entire new water and light plant.

FIRE AND POLICE

Auto Engine Reaches Fire Where Horses Fail

Trenton, N. J.—A fire broke out at the grounds of the Interstate Fair Association where two large shows are wintering, and but for the use of automobile fire apparatus the grand stand and buildings all would have been destroyed. It was impossible for horses to drag the engines through the drifts and in the face of the wind and snow. The Webb fire engine got to the grounds, three miles away in fifteen minutes and extinguished the fire after it had done $60,000 damages. The Fire Commissioners and Chief Charles S. Allen are considering the advisability of entirely doing away with horses as a means of propelling fire engines.

Jenkintown Auto Engine Makes Good

Jenkintown, Pa.—A recent alarm sent in from Flourtown, more than a four-mile run, resulted in a quick get-away from the firehouse on Greenwood avenue, with the machine fully equipped, manned by 17 volunteer fire-fighters, and driven by Fire Chief Andrew Graham. In just 11 minutes from the time it left the fire station the automobile apparatus was in action at the fire in Flourtown, and did effective work in saving of property. Fire Chief Graham openly asserts the same run can be made in eight minutes. By the record run the auto-truck reached the fire ahead of the apparatus, horse-drawn, from Ambler, with less than half the same distance to cover.

Prisoners as Well as Police Remembered

Fort Worth, Tex.—The Police Department celebrated Christmas in fine style when at morning roll call all the men were present. Corporation Judge Lane, who presided, presented Police Commissioner George H. Mulkey with a gold star badge on behalf of the members of the force. Chief Polk received a handsome gold watch, Assistant Chief Parsley a fine service coat, Captain Bills an Eagle-emblem watch charm and Captain Martin a Woodman of the World emblem. Commissioner Mulkey then announced an increase of $10 per month in the salary of every member of the Department, and Judge Lane concluded the festivities by bringing in all the prisoners in the city jail and city workhouse and ordering their release.

Celebrated Arrival of New Fire Wagon

Kearny, N. J.—Highland Hose Company No. 4, of Kearny, has received its new combination chemical and hose wagon from the manufacturers in Providence, R. I. The new wagon has a steel body and is equipped with every modern device. Its weight, empty, is 3800 pounds, but with hose attached and chemical tanks filled it will weigh 5500 pounds. It will be provided with 800 feet of hose. The double chemical tanks are capable of holding seventy gallons. The apparatus was tested at a fire made of barrels and boxes in the baseball field behind the public library Christmas morning at 11 o'clock.

Auto Hauls Hose Cart

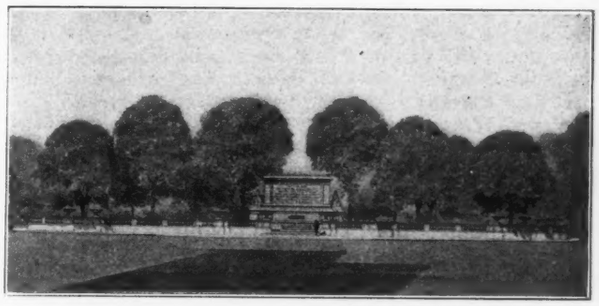
Kingman, Kan.—The local fire chief of Kingman, S. F. Mead, owns a "Hudson 20" and uses it to cover all fires in the city and vicinity. He has it equipped to carry eight firemen, besides hauling the large hose cart, and it is no unusual thing to see the equipment making a speed of twenty-five miles an hour over the city streets in response to an alarm.

AUTO APPARATUS OF KANSAS TOWN

FIREMEN'S MEMORIAL FOR NEW YORK

City Art Commission Approves Magonigle Design for Union Park—Gift of Citizens to Firefighters

New York, N. Y.—The Firemen's Memorial Fund Committee is now in a position to announce that the design for the memorial has been approved by the Municipal Art Commission and that the work of construction will soon be begun on the site selected at the north end of Union Square, now occupied by a wooden cottage. This site was chosen by an advisory board of architects, consisting of William R. Mead, Cass Gilbert, Thomas Hastings, Henry R. Marshall and H. Van Buren Magonigle, as being not only well adapted to the purpose, but, being in the heart of the city, is passed daily by thousands of people. Moreover, for several years the Fire Department has held its public drills at this point and it is therefore specially identified with the firemen in the public mind. The monument proper is in the form of a votive tablet about 25 feet long, 22 feet high and 8 feet thick, flanked by two statues symbolical of duty and sacrifice. On the northerly face will be carved an inscription composed by Royal Cortissez, the art critic, which reads:



FIREMEN'S MEMORIAL, NEW YORK CITY

To the Men
of the Fire Department of the City of New York
Who Died at the Call of Duty,
Soldiers in a War That Never Ends,
This Memorial Is Dedicated
by the People of a Grateful City.

On the southerly face of the monument will be a bas relief, over 18 feet long and 8 feet high, representing a dash to a fire and the other elements of a scene familiar to every New Yorker. To right and left of the monument will extend a balustrade enclosing a large fountain basin on the north, east and west, leaving the south side of the basin open to the park. The memorial, including the enclosing balustrade and the basin, will be about 180 feet long by about 60 feet wide, and will be constructed of warm toned Knoxville marble and Milford granite; all the sculpture will be in marble. The design is classic in character and is the work of H. Van Buren Magonigle, the architect of the McKinley National Memorial at Canton, O., and of the National Maine Monument. The cottage and the old cast-iron flag and lamp standards will be removed, and the paths and grass plots in the square rearranged to make passage across the park easier and more direct for the thousands that cross it daily. The Firemen's Memorial was suggested by the late Bishop Potter in his sermon at the funeral of Fire Chief Kruger in St. Thomas's Church in the Spring of 1908. More than $50,000 was raised by the committee by the Fall of the same year. Bishop Potter was the first chairman of the committee. Following his death Isidor Straus became chairman. The other members of the committee are: General Thomas L. James, treasurer; Andrew Carnegie, Henry W. Taft, Fire Commissioner Hayes, Fire Chief Croker, the Rev. Dr. Henry A. Brann, George W. Babb, Cornelius N. Bliss, Hamilton W. Mabie, Egerton L. Winthrop, Jr., and Cecil J. Allen, secretary.

Has Built Motor Fire Truck

Baltimore, Md.—Joseph Luhrman has completed a new automobile fire truck. The truck has a pump attachment to it, which the engine will operate. He made a trial trip on White avenue and the Harford road with seven men aboard recently, and the run proved very satisfactory.

GOVERNMENT AND FINANCE

Would Kill Mayor With Kindness

Columbus, O.—The salary of the Mayor-elect of Columbus has been advanced from $3,500 to $5,000 by his political enemies. When the vote was taken in Council, every friend of the incoming Mayor voted against the increase in salary, while those who have fought George S. Marshall, the successful candidate, since he has been in public life, voted for the increase. Mr. Marshall was elected on a straight economy platform, but it was shown afterwards when the ordinance for an increase in salary came up for action that he himself had written the ordinance, and wanted the raise. Then the enemies got busy and helped him in every way possible. They predicted that it would be his political suicide to accept the increase, because of the platform upon which he was elected, and now they await the outcome. It is very seldom that the enemies of a man in this world vote him $1,600 annually for two years. That is exactly what was done with the incoming Mayor of Columbus.

Retiring Board Retired

Chicago, Ill.—The City Retiring Board, which has been accustomed to decide on the physical condition of policemen and to recommend retirement to the pension list has come under the ban of the courts. In a ruling announced by Judge Scanlan, of the Circuit Court, President Elton Lower, of the city Civil Service Commission, Health Commissioner W. A. Evans and Dr. W. L. Baum were ousted from the position as members of the Retiring Board, and were fined one cent each for "usurping and intruding into or unlawfully holding said positions or offices," on the Retiring Board. The legality of the Retiring Board was questioned by policemen, who feared that by reason of the medical and physical examinations of the Board they would lose their positions. The Board already has retired scores of veteran policemen.

Board of Works Abolished

Lexington, Ky.—Mayor John Skain has signed an ordinance abolishing the Board of Public Works. A superintendent of public works will be appointed to perform the executive duties of the former board.

City Ownership Planned at Marshalltown

Marshalltown, Ia.—The movement for municipal ownership of public utilities and the establishment of a municipal party was launched here at a meeting of supporters of the plan, headed by Ex-Mayor Frank G. Pierce. Mr. Pierce, as temporary chairman, was given authority to name a committee of 25, five from each ward in the city, to work out the details of the organization and choose permanent officers. Later the plans are to be placed before a public meeting, with the view of securing endorsement. Several plans are being considered. They range from attacking the present gas, electric and street car company in the courts, on the validity of their franchises, and on the ground that they have annulled the franchises by continued violations, to the erection of a competing city plant. Legislation is also talked of in the hope of securing for cities the right to operate street car lines in conjunction with gas and electric plants.

North Hudson Towns Defeat Consolidation

West Hoboken, N. J.—The referendum has again failed in New Jersey, as on December 28 the voters of the six towns and townships forming what is commonly known as North Hudson were called on to vote on the question of consolidating them into one city. Not more than 30 per cent of those entitled to go to the polls and vote "Yes" or "No" availed themselves of the right. There had been public meetings in every town and the benefits and advantages of the plan had been discussed and the "stand-patters" had had their say, but nothing could bring the voters to the polls. The six towns concerned—Weehawken, Union Hill, North Bergen, West Hoboken, West New York and Guttenburg—occupy all of Hudson County from the northerly line of Jersey City and Hoboken to the Bergen County line. Combined they have a population of about 90,000. Every town was recorded against consolidation, the total vote being 1,662 to 4,607.

RAPID TRANSIT

Baltimore Has P-A-Y-E Cars

Baltimore, Md.—Pay-as-you-enter cars were placed on the Pennsylvania avenue line of the United Railways and Electric Company January 1 by President William A. House. There are 35 of these cars, which were remodeled for the purpose at considerable cost by extending the rear platform. The car beds were practically rebuilt. These are the first installed in Baltimore.

Every Type of Transit Needed for Suburbs

Brooklyn, N. Y.—Public Service Commissioner Edward M. Bassett delivered an address before the Gravesend Board of Trade on "Rapid Transit in the Outlying Districts." During the course of his remarks Commissioner Bassett said that rapid transit in the future would not consist of subways only. Elevated roads, depressed roads and embanked roads will assist materially in solving the problem of transportation. The enormous cost of a four-track subway, according to the speaker, makes it impossible for the city to construct one in every congested section. "This," continued Mr. Bassett, "means a two-track subway, or other forms of rapid transit must be largely used for the development of the various districts. Elevated roads can be made more picturesque and noiseless than at present. In the future it is likely that surface lines will be largely used to distribute the people residing in the outlying districts. A good example of this prediction can be found on the Church avenue line. Hundreds of persons who travel on that road are transferred to the Brighton elevated, by which they are able to reach their homes." The Commissioner also spoke of the advantages of the assessment plan, saying that it is better to have a car line constructed by the assessment plan than waiting for the city or some corporation to furnish rapid transit.

Thirty-five Mile Ride for Five Cents

Chicago, Ill.—A 35-mile ride for 5 cents will be made possible by the $70,000,000 merger of all the surface railway lines of the South Side. The average total number of passengers carried annually on the lines involved in the railway merger is 340,000,000. Of this great number it is estimated that 220,000,000 are cash fares and the remainder transfers. The various roads involved in the merger cover 407 miles of railway.

Bonding of Tracks to Prevent Electrolysis

Lockport, N. Y.—The Committee on Fire and Water of the Common Council has approved of the resolution of Alderman Rignel calling for the bonding of the tracks of the International Railway between this city and Paynes avenue, North Tonawanda, to prevent the electricity escaping and damaging the Lockport water supply pipe by electrolytic decomposition.

Fifteen-Minute Service Required on All City Lines

Oshkosh, Wis.—The Common Council has given the Wisconsin Electric Railway Company, of which Clement C. Smith, of Milwaukee, is President, something of a jolt by deciding that the company must operate its cars on every line in the city at least on a 15-minute schedule.

Suburbanites Win Five-Cent Fare Fight

Salem, Ore.—The State Supreme Court has rendered a decision in the case of the Portland Railway, Light and Power Company against the Railroad Commission of Oregon. This was an appeal from the decision of Judge Galloway of the Circuit Court, and the Supreme Court's decision is in affirmance of it. The appeal was taken from an order of the Railroad Commission requiring the railroad company to reduce its fare from 10 to 5 cents; also to deliver to passengers transfer tickets on paying the diminished fare. The court holds that the company must not charge a fare in excess of 5 cents from Milwaukee to Portland, and must also give transfers.

Headlights on Cars at Sunset

Tacoma, Wash.—An ordinance has been introduced in the City Council providing that headlights on street cars operated in the city be lighted at sunset, and is being considered by the Streets and Alleys Committee.

STREET CLEANING AND REFUSE DISPOSAL

Auto Truck Cleans Snow in New York—Teams Scarce—Laborers Plentiful—Work of Snow Scrapers

New York, N. Y.—The Street Cleaning Department, under Commissioner William H. Edwards, has had a busy time during the past week clearing away the 10 or 12 inches of snow which fell during the Christmas storm. The entire task fell upon the Department, as a contract for the work had not been let, although specifications had been prepared and bids advertised for in September, these having been rejected and new ones advertised for to be opened December 31. By that time, however, most of the snow had been piled up and a large part of it carted away, that from the principal streets having been removed during the first two or three days. Applicants for work were put on as rapidly as they applied at 25 cents per hour, until seven or eight thousand shovelers were on the payrolls; but difficulty was experienced in securing trucks. Brooklyn and the Borough of the Bronx were well taken care of by local truckmen and contractors; but it was necessary to put on teams sent from Brooklyn, Staten Island and parts of Jersey to clean the streets of Manhattan. Twelve or fifteen hundred trucks were in use, but Commissioner Edwards was anxious to secure 1,000 more, and early in the week raised the figure for hauls south of Fifty-ninth street from 30 to 45 cents a cubic yard, as the hauls in that section are generally of greater length than further north, where the island is narrower, and the North and East Rivers, where the dumping is done, is more accessible.

The use of an automobile truck for hauling away the snow was also instituted by Commissioner Edwards, and the

LOADING SNOW ON ORION AUTO TRUCK

success attending the experiment will undoubtedly result in their further use. A contract was entered into with Henry Ducasse & Co. for the use of an "Orion" wagon at $15 per day, by which means it was possible to make an average of nine loads per eight-hour day from Union Square to the East River, carrying 10 cubic yards on each trip. Other trucks made but six or seven loads, and carried much less material, an ordinary cart hauling 1½ cubic yards; sand truck, 3 yards; brick truck, 4 yards, and large asphalt wagons, 5 yards. The trip to the East River was made by the motor vehicle in five or six minutes, notwithstanding the congestion of traffic, and comparatively much better time would have been made but for the fact that the same number of men were assigned to load it as an ordinary truck, thus requiring about three times as long. The vehicle is 20-22-horsepower French, which is equivalent to 28-horsepower American; has two cylinders, and is capable of 13½ miles per hour with full load; the chassis is 16.3 x 6.8 feet, and its wheel base, 11.5 feet. The body is 11.6 x 6 feet and 2.10 feet high. The chassis complete weighs 2½ tons, carries twin solid rubber tires on rear and single rubber tires on front and has steel wheels. It has two advantages—a low platform and two-cylinder engine, which makes 550 revolutions per minute, against 1,000 to 1,500 on the average motor truck. No difficulty was experienced in making headway through the great drifts, and Commissioner Edwards and his Deputy, James J. Hogan; District Superintendent A. F. Gunther, who has particular charge of the snow work, and Mr. F. L. Stearns, Engineer of the Department, were all pleased with its work.

ORION AUTO TRUCK LOADED, READY TO DUMP

Sixty snow scrapers were put at work during the first day or two of the storm, but they were rendered useless when the snow became frozen, and had to be laid away until the thaw came. They have, however, demonstrated their usefulness, and were not purchased any too soon by Commissioner Edwards, some of them having arrived during the storm and being immediately placed in use. Mayor McClellan took occasion to compliment Commissioner Edwards and his assistants for their handling of the work. The Board of Estimate appropriated $400,000 for snow removal, an average of $40,000 an inch for the entire city.

Garbage Funds Short; Collection Stopped

Dayton, O.—The garbage situation in Dayton became acute during the last week of 1909. All the money appropriated for the department during the past six months had practically been exhausted. What little remained was used to collect the refuse from the hotels and restaurants in the downtown districts. While this was done the residential portions suffered. Complaints came to the Service Board and Board of Health by the wholesale. Some claimed that they had six barrels of garbage and many of ashes that had not been emptied. Although conscious of the gravity of the situation, the Board could not do anything until the first of the year. Another aggravating element was the contract which the city had with the Dayton Reduction Company. This will not allow the slop owners to give their refuse away, as it is declared to belong to the company. This prohibits the private removal of the garbage.

Would Dispose of Garbage Outside of City

Wheeling, W. Va.—The proposition to locate the new city crematory at a point without the city limits seems to find favor with a number of the Councilmen, as well as a large portion of the citizens who do not see the wisdom of forcing an incinerator upon a section of the city not seeking it. The fact that there is ground available and within a short distance of the city where such a plant could be built on the railroad without interfering with any one or being near a residence district has made the outside location strong. A Baltimore & Ohio official estimates the cost of hauling the refuse to a plant to be located from 12 to 15 miles down the river at from $12 to $15 a car, with a possibility that a conference would produce a lower rate. This means that the refuse would be collected over the city to a central point, probably near the Wheeling terminal tunnel or possibly at a point along the Baltimore & Ohio Railroad and loaded. Covered cars would make it unobjectionable, and the fact that the cars would be quite a distance from any residence would make it possible to do this and annoy no one. It has been estimated two cars a week would care for the city's refuse, while once loaded it would be hauled at night to the plant. The total cost a year would not exceed but very slightly, it is said, $1,200, while of the $8,900 now appropriated for the crematory contract it is claimed that fully a third of the charge is due to the long and costly haul to the top of Wheeling Hill, where the present crematory is located.

MISCELLANEOUS

New Building Code to Be Acted Upon After First of Year

Chicago, Ill.—One of the first matters to be taken up by the City Council this year is the new building code, which the Building Committee has been working on for a year and a half. The committee work on the ordinances has been completed, but there promises to be a long-drawn-out battle upon the floor of the Council before the ordinances are passed. Acting upon the wishes of Chief Michael Horan of the Fire Department, the committee has strengthened the sections regarding the use of frame buildings, which sections do not meet the approval of the Aldermen in the crowded wards. One of the provisions that the Fire Chief has been contending for is to prohibit the moving of a frame building from the front to the back of the lot, and the erection of a brick or stone building in front. He says this system is one of the sources of great trouble to the Fire Department. The billboard section has also caused all kinds of trouble, and the billboard men are to put up a determined fight against the revised ordinance, which limits the height of billboards and restricts their use on certain streets, and provides for consent of a majority of the property owners.

Fire Cistern Blown Up by Gas

Topeka, Kan.—Explosions of natural gas in the streets of Topeka have been frequent lately. The Seventh street fire cistern, where an explosion occurred a few weeks ago, was regarded as specially dangerous. Mayor Green suggested to City Engineer Fulton that he put an electric fan in the cistern and so clear it of gas preliminary to an investigation as to the source of the leak. Fearing that a spark from the fan would ignite the gas, the City Engineer thought best to throw an ignited piece of waste in first to see if much gas was there. A sufficient quantity was found to blow a hole in the street about forty feet in diameter. The question of repairing or abandoning the cistern will be taken up.

Will Plant Two Million Trees

Harrisburg, Pa.—The State Forestry Department will have 1,800,000 young trees of its own growing to set out next spring. There are 2,294,000 trees in the Mont Alto nursery, 2,012,000 at Aspah, Tioga County; 1,362,000 at Greenwood, Huntingdon County, and about 70,000 at the other places. The nearly 2,000,000 trees that are to be set out next spring are now being selected. They are from two to three years old. Commissioner Conklin's plan is to set out about 2,700 pines to 1,800 hardwoods per acre.

City-Owned Baths at Coney Island

New York, N. Y.—Public baths at Coney Island, with a flat rate for the rental of bathing suits, for the purpose of preventing the high rates charged at the beaches on Saturdays and holidays, is advocated by Dr. William H. Hale, Superintendent of the Public Baths of Brooklyn. The project was first announced at the meeting of the American Association for the Advancement of Science, in session in Boston. Dr. Hale referred to the high prices charged by the bathhouse keepers whenever there is a rush at Coney Island, also at Brighton, Manhattan and other beaches. From a rate of 35 cents a person the price is often raised to 50 cents and $1. "At Coney Island," said he, "on land already owned by the city we could erect a bathing pavilion which would be a great public utility, and by renting bathing suits at 25 cents we could supply a great public want at prices amply remunerative to the city, though still materially lower than the private owners now charge to the public. The establishment of such a plan at Coney Island will prove so popular that the private owners will be forced to maintain a regular and a lower rate."

Paris Will Spend $180,000,000 on Improvements

Paris, France.—The Chamber of Deputies has authorized the Paris municipality to contract for a loan of 900,000,000 francs ($180,000,000) for an elaborate scheme of improvements, including the demolition of unsanitary quarters, the construction of new streets, gardens and schools and for other changes in public works. Plans for the improvements have been under consideration for a long time, and work will now be started as soon as possible.

Storm Damage in Some Cities

Boston, Mass.—For the first time in 11 years the Boston Elevated was tied up by the storm December 26. The tide was a foot or more deep on Atlantic avenue.

Lawrence, Mass.—The police and fire alarm telegraph systems were put out of commission.

Somerville, Mass.—Lighting and fire alarm wires were torn down in practically every street in the city.

Newport, R. I.—The Ocean Drive was badly washed, particularly at Bateman's Point.

Providence, R. I.—The city was without electric lights. There were so many crossed wires that power stations were shut down.

Newton, Mass.—There was no car service and no lighting.

Chelsea, Mass.—The dike which has held back the tidewater for 60 years gave way with the recent thaw. An area of three-quarters of a mile was flooded and 2,500 people were driven from their homes. The "5—3" police call was sounded to give the people warning. The boulevard and seawall built in 1900 were seriously damaged.

Portland, Me.—The tracks of the trolley cars to South Portland were inundated by the high tide.

Quincy, Mass.—The electric light, fire alarm, street railway and telephone wires were blown down.

Lynn, Mass.—Flooding of warehouse containing lime caused fires.

Wakefield, Mass.—Municipal lighting plant was shut down for fear of danger from broken wires.

Gloucester, Mass.—The fire and police alarm systems were put out of commission.

Pittsfield, Mass.—The entire Fire Department fought a fire for 11 hours which destroyed a block. The firemen were at times hip-deep in the snow.

Smyrna, Del.—The roof of the Smyrna gas plant fell in as a result of the weight of snow, causing an explosion, and the supply of gas was shut off for 12 hours.

Valid Bread Law Being Enforced

Chicago, Ill.—City Sealer Kjellander has notified the bakers and dealers in bread that they must comply with the ordinance requiring loaves to be of a standard size, either one pound or even fractions of a pound or multiples. The bakers were given until January 3 to make the necessary arrangements for baking the loaves and to get the labels bearing, in plain type, the weight of a loaf; but now a vigorous inspection campaign is to be made, and the City Sealer will prosecute any baker or seller of bread who fails to comply with the ordinance, which was recently declared valid by the Supreme Court.

City Can Regulate Size of Bread Loaf

Springfield, Ill.—The Illinois Supreme Court has declared that a City Council has the right to pass an ordinance specifying the size and weight of a loaf of bread, the conditions under which it must be made, and that it is the duty of the baker to provide scales so a customer may inform himself, if he wishes, as to the exact weight of the loaf. The decision was on appeal from Cook County, where a Chicago ordinance was declared invalid in the case of Chicago vs. Matthias Schmidinger. The decision of the lower court is reversed and the case remanded.

Putting Poor Farm on Paying Basis

Wakefield, Mass.—That the municipal farm and almshouse and support of the poor will in the course of four or five years cost the town nothing, and may perhaps be a source of income, is the enthusiastic declaration of the Finance Committee, which, after examining the report of the Overseers of the Poor, is publicly commending the Board upon the excellent showing made during the year. The Overseers are Hugh Connell, William C. Strong and William F. Bowman, and since they assumed charge two years ago they have succeeded in increasing the receipts of the farm from about $1,500 annually to nearly $6,800, and have reduced the expenses of the entire department from $2,000 to $3,000, also making improvements. In past years the department has cost the town over $14,000 annually. For next year the Board asks for $12,000, and, with a balance of $600 on hand and $350 due, it does not expect to use the whole amount. The present stable of 25 cows will be increased, as the milk sales are the chief item of income, and the land has been vastly more productive than formerly.

LEGAL NEWS

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

Dumping Refuse in Tidal Waters

United States vs. Newark Meadows Improvement Company et al.—A point on the waters of the ocean within a marine league of the coast of New Jersey is within the State by Act of New Jersey May 17, 1906, and therefore within the Federal district of New Jersey; and under the Constitution of the United States, article 3, section 2, and the sixth amendment, a criminal offense against the laws of the United States committed at such point can only be prosecuted in that district. Under Act of June 29, 1888, as amended by Act of August 17, 1894, which makes it a criminal offense to dump refuse in the tidal waters of New York Harbor within prescribed limits, or to deviate from the dumping grounds specified in a permit granted thereunder, an offense is not committed until refuse is dumped in some prohibited place, and such place fixes the locus of the crime and the venue for its prosecution. A State bordering on the sea may, in the exercise of its sovereignty, extend its own borders for the distance of one marine league from low-water mark, and make the region so annexed as much a portion of the State as any other part of its territory. "Main sea" and "high sea" are synonymous. The term "high seas" includes waters on the seacoast and without the boundaries of low-water mark.—United States Circuit Court, 73 F. R., 426.

Refusal to Sign Warrant—Mandamus

American La France Fire Engine Company vs. Seymour, Mayor of Orange.—The payment of a bill against the city having been ordered by the Common Council of the city of Orange, which has control of the city's finances, and the bill having been presented to the Mayor for his approval, and after his disapproval having been again, after investigation, ordered paid by a requisite majority of Council, the Mayor, his signature being essential, has no election but to sign the necessary warrant, and upon his refusal a writ of mandamus will issue. On application for a mandamus, where both parties have been heard, and there is no dispute about the facts, and the law is with the applicant, a peremptory writ of mandamus may be granted in the first instance.—Supreme Court of New Jersey, 74 A. R., 439.

Apportionment of Taxation

Borough of Kenilworth vs. Board of Equalization of Taxes.—A municipality which objects to the apportionment of taxes by the County Board upon the ground that the total of ratables as returned by its Assessor is excessive must object promptly. The apportionment will not be reviewed by the court where the municipality waits until December 14 to make any objection.—Court of Errors and Appeals of New Jersey, 74 A. R., 480.

Franchise—Obligation of Contract

City of Pocatello vs. Murray.—Where a city, having power to do so, entered into a contract with a water company, granting a franchise and fixing charges which might be made to consumers, and also providing the mode by which such charges might be changed from time to time after a fixed term, such provision was a material part of the contract, which could not be impaired or affected by a subsequent State statute providing a different mode of establishing rates generally. A court of equity is without power, at suit of a city, to fix the rates to be charged by a water company in the future, which is not a judicial function.—Circuit Court, Department of Idaho, 173 F. R., 382.

Police—Removal—Hearing

People ex rel. Cunningham vs. Bingham, Police Commissioner.—New York Charter, which gives the Police Commissioner power, in his discretion, on conviction of a policeman, by him or any court or officer of competent jurisdiction, to punish the offender by dismissal, does not compel a Commissioner to accept as conclusive an acquittal from conviction of a policeman for bribery in the criminal courts, on a hearing of charges against such officer for conduct unbecoming an officer.—Supreme Court of New York, 119 N. Y. S., 417.

Use of Streets—Railroads

Grand Trunk & Western Railway Company vs. City of South Bend et al.—The Legislature, primarily, has control over city streets, they being highways of the State. Legislative control of city streets, being part of the police power, cannot be surrendered or contracted away. The Legislature may delegate to a city the power of control over its streets. To cities has been delegated the power to permit railroads in streets; but the grant of such right by a city is necessarily legislative in character, as the Legislature can permit the construction of tracks in streets over the objection of the city. The grant of the right to use a street is taken upon the implied condition that it shall not be be used so as to destroy its legitimate use to the public. An ordinance enacted by a city, the Common Council of which was given exclusive power over its streets by the Revised Statutes of 1881, authorizing a railroad company to lay two tracks in a street, the right to do which was not attempted to be exercised for more than 35 years thereafter, did not relate to the administrative functions of the city, but was legislative in character, and made subject to the future exercise of the city's police power, so that it could revoke such right any time it decided that the public interest demanded it, unless it acted fraudulently, arbitrarily, or unreasonably in doing so.—Supreme Court of Indiana, 89 N. E. R., 885.

Assessment—Irregularity—Publication

Coats Shingle Company et al. vs. City of Hoquiam et al.—Where no time or place was fixed for equalizing an assessment roll for street improvements, and the City Council did not equalize the assessment as required by the Laws of 1907, and the roll included large sums which were not a part of the cost of improvements, and, while the initiatory steps to the improvement were taken both by resolution and ordinance, the ordinance was never published as required by the Laws of 1907, the proceedings were so irregular as to avoid the assessment so made.—Supreme Court of Washington, 105 P. R., 141.

Street Improvement—Injunction

City of Ocala vs. Anderson.—Where a bill in equity, brought to enjoin the construction by a city of a highway on complainant's land, alleges in specific terms the title and possession of the complainant, and the acts of the officers and agents of the city in constructing the highway on the land without authority of law or notice to or permission from or compensation to the complainant, and prays for appropriate injunction, the relief prayed may be granted, whether the city authorized the acts of its agents or not.—Supreme Court of Florida, 50 S. R., 572.

Negligent Construction of Sidewalk—City's Liability

Prowell vs. City of Waterloo.—An independent contractor, constructing a cement extension to a sidewalk over a parkway to meet the curb, placed stones around it and a wire about two feet from the ground. A passer after dark, there being no lights, ran into the wire, and was injured. Held, that the city was liable, since its duty to keep the walk in a safe condition by warning lights could not be delegated to an independent contractor.—Supreme Court of Iowa, 123 N. W. R., 347.

Improvement Assessments—Change in Charter

Hallett vs. City and County of Denver et al.—It is no ground of objection to assessments for sidewalk improvements that the improvements were begun while one charter was in force and completed after adoption of a new charter, the latter expressly preserving the old regulations and continuing them in existence till completion of the entire process of assessment.—Supreme Court of Colorado, 104 P. R., 1038.

Special Assessments—Objections

City of Seattle vs. Sylvester-Cowen Investment Company.—A finding of the trial court on a hearing on objections of a property owner to a special street assessment that the city should pay a certain amount in addition to the assessment theretofore made against the city will not be disturbed on appeal, where it does not appear that the evidence so clearly preponderates against the finding as to indicate that the court acted arbitrarily.—Supreme Court of Washington, 104 P. R., 1121.

NEWS OF THE SOCIETIES

American Society of Civil Engineers.—The annual meeting will be held in the Society House, 220 West Fifty-seventh street, New York, N. Y., January 19-20, 1910. The annual reports will be presented, officers for the ensuing year elected and members of the nominating committee appointed. The progress report of the special committee on steel columns and sheets and the progress report of the special committee on bituminous materials for road construction will be presented for discussion. Through the courtesy of George Gibbs, Chief Engineer of Electric Traction and Tunnel Station Construction of the Pennsylvania Railroad, members of the society are invited to visit the new station. The inspection will occupy the entire afternoon. Tuesday will be devoted to a visit to the Ashokan reservoir. At 8:15 p. m. Walter McCulloh, Consulting Engineer, State Water Supply Commission, will address the society on the "Conservation of Water Resources in the State." At 9:30 p. m. there will be an informal smoker at the Society House.

Pennsylvania Good Roads Association.—Organized three years ago, but resting virtually dormant since then, the association at a meeting at Philadelphia December 21 became active. Plans were formulated for a campaign, the object of which is to place Pennsylvania foremost among the States in the matter of good roads. The following officers were elected: Dr. Donald McCaskey, Lancaster, president; Howard Longstreth, Philadelphia, secretary and treasurer; Frank Thomson, vice-president; Joseph H. Weeks, chairman. The dominant note of the campaign will be the education of those who build and keep and use the roads. This campaign will be widespread. Under the supervision of the State organization, which will have headquarters both in Philadelphia and Lancaster, literature will be sent broadcast all over the State. The association will also send out emissaries to organize branch societies in every one of the 67 counties of the State, and these branches will be imbued with the same spirit that animates the governing body. The association has been promised the assistance of the department of the Postmaster-General and the use of 2,500 rural free delivery carriers to distribute its literature, free of charge. Figures compiled by the association show that there are 98,000 miles of roads in the State. Of these 4,000 miles have been improved. Pennsylvania stands fourteenth in the list of States in the matter of good roads. The association will ask for liberal State aid, and will urge an issue of bonds for a $50,000,000 loan for road extension and repairs. One of the first stretches of road to receive attention will be a section 12 miles long, between Coatesville and the Gap. This is on the old Lancaster Pike, and is the one bad spot between Philadelphia and Lancaster. A special campaign of education will be inaugurated among the farmers, and it is expected that 31,000 of them will be reached with literature. Efforts will be made to increase the membership of the association. No dues are charged. Instead the purchase of a Good Roads button, at a cost of 10 cents, or a subscription to the "Good Roads Advocate," the official organ of the association, are sufficient to constitute membership.

New England Water Works Association.—The annual meeting of the association will be held at Hotel Brunswick, Copley Square, Boston, on Wednesday, January 12. The program follows:

10:00 o'clock. The Headquarters in Tremont Temple will be open for the use of members. 11:30 o'clock. Meeting of the Executive Committee at the Headquarters, Tremont Temple. 1:00 o'clock. Lunch will be served at Hotel Brunswick, Copley Square. Tickets, $1.50, to be had at headquarters during the morning and later at the hotel. 2:00 o'clock., regular order of business: Address of retiring president, report of secretary, report of treasurer, report of editor, report of Auditing Committee, election of officers, report of tellers appointed to canvass ballots.

The following papers will be presented: "Governmental Policy in Relation to Water Powers," Marshall O. Leighton, Chief Hydrographer, United States Geological Survey, Washington, D. C.; "The Maidstone Typhoid Epidemic," illustrated, William T. Mason, professor of chemistry, Rensselaer Polytechnic Institute, Troy, N. Y.

Report of Committee "To Prepare a Standard Specification for Fire Hydrants."—H. O. Lacount, George A. Stacy, Frank A. McInnis, Frederick W. Gow, William F. Sullivan, Committee.

League of Improvement Societies.—A meeting was held December 21 in Gelb's parlors, Providence, R. I. After the dinner President E. A. Noyes introduced President Howard Edwards of the Rhode Island State College as presiding officer. The principal address was delivered by John Nolen, Cambridge, Mass. He said that Providence had an opportunity greater than any other American city, except Washington, of securing the most useful and beautiful railroad approach. He defined the object of city planning as follows: "There are three main purposes of city planning. First, to stop waste in the expenditure of vast sums to undo or to do over, mistakes caused by a lack of foresight; second, to develop individuality of cities; third, to develop the important natural features of cities for the common welfare of all the people, rather than to leave them for the exploitation of a few selfish individuals. Mayor Fletcher gave a brief address on billboards. A resolution introduced by Terence M. O'Reilly calling attention of the Legislature to the need of statutes regulating billboards was passed. A resolution was introduced by Luther D. Burlingame, that a commission of expert civic advisors be appointed to make plans for the development of the civic center of Providence. This resolution was adopted.

Manhattan Central Improvement Association of New York.—The object of this newly organized association is to aid in the development, improvement and protection of the property included within the district bounded by Thirty-first and Thirty-seventh streets and the East and Hudson rivers. The officers are: Isidor Straus, president; Roderick McLeod Cameron and Edwin H. Popper, vice-presidents; William R. H. Martin, treasurer, and Cecil J. Allen, Marbridge Building, Broadway and Thirty-fourth street, secretary. At a meeting December 29 a report of the committee appointed to consider the question of a moving platform under Thirty-fourth street was received. The report deals exhaustively with the effect the innovation would have on vault rights, stoop lines and encumbrances and on the prospective widening of the driveway in the street. It will be laid before a full meeting of the association. Mr. William R. H. Martin, Mr. A. Sulka and Mr. Edwin H. Pepper were appointed a committee to prepare a report on the advisability of the widening of the driveway in Thirty-fourth street. Mr. C. J. Allen, secretary of the society, said: "Our aim is to get ahead with these discussions as fast as possible, so that we shall be in a position to deal with the increased crowds which the opening of the Pennsylvania terminal will bring into this neighborhood."

Northwestern Cement Products Association.—Owing to the illness of President Roche and the resignation of Secretary Pfiffner, the sixth annual convention announced for March 5 in St. Paul will be abandoned and the association will join the Cement Products Exhibition Company in the exhibition at Chicago, February 18-21.

Calendar of Meetings

January 6-8.
Montana Society of Engineers.—Annual meeting, Butte, Mont.—Clinton H. Moore, Secretary, Butte, Mont.

January 12.
New England Water Works Association.—Annual meeting, Hotel Brunswick, Boston, Mass.—Willard Kent, Secretary, Narragansett Pier, R. I.

January 12-14.
Michigan Engineering Society.—Annual meeting, Lansing, Mich.—Alba L. Holmes, Secretary, 574 Wealthy ave., Grand Rapids, Mich.

January 14-16.
Indiana Engineering Society.—Annual convention, Indianapolis, Ind.—Chas. Brossman, Secretary, Union Trust Bldg., Indianapolis, Ind.

January 18-20.
American Society of Heating and Ventilating Engineers.—Annual meeting, New York, N. Y.—W. H. Mackay, Secretary, P. O. Box 1818, New York, N. Y.

January 19-20.
American Society of Civil Engineers.—Annual meeting, New York, N. Y.—Charles Warren Hunt, Secretary, 220 W. 57th st., New York, N. Y.

January 20-21.
Ohio State Board of Health.—Tenth Conference with Local Boards, Columbus, O.—C. O. Probst, Secretary, Columbus, O.

January 20-22.
American Society of Inspectors of Plumbing and Sanitary Engineers.—Annual convention, Trenton, N. J.—C. S. McCosker, Secretary, Mobile, Ala.

January 25-27.
Canadian Society of Engineers.—Annual meeting, Ottawa, Ont.—C. H. McLeod, Secretary, 413 Dorchester st., West, Montreal, Quebec.

January 26-28.
Illinois Society of Engineers and Surveyors.—Annual meeting, Cairo, Ill.—E. R. Tratman, Secretary, 1636 Monadnock Block, Chicago, Ill.

February 7-12.
National Brick Manufacturers Association.—Annual convention, Pittsburg, Pa.—T. A. Randall, Secretary, Indianapolis.

February 8.
Connecticut Society of Civil Engineers.—Annual meeting, New Haven, Conn.—J. Frederick Jackson, Secretary, Box 1304, New Haven, Conn.

February 18-21.
Northwest Cement Products Association.—Sixth Annual Convention, Great Northern Hotel, Chicago.—L. V. Thayer, Chairman Committee of Arrangements, Minneapolis, Minn.

February 21-25.
National Association of Cement Users.—Annual meeting, Chicago, Ill.—Geo. C. Wright, Secretary. Address communications to Edw. E. Krause, Asst. to President, Harrison Bldg., Philadelphia, Pa.

February 24-26.
American Society of Engineering Contractors.—Annual convention, Chicago, Ill. Daniel J. Hower, Secretary, Park Row Building, New York City.

February 24-26.
Illinois Association of Municipal Contractors.—Annual meeting, Chicago, Ill.—Orle T. Dunlap, Secretary, Edwardsville, Ill.

March 9-11.
Iowa Association of Cement Users.—Annual meeting, Cedar Rapids, Ia.—Ira A. Williams, Secretary, Iowa State College, Ames, Ia.

PERSONALS

ALDRICH, E. C., has been appointed City Engineer of Auburn, N. Y., succeeding W. Thomas Wooley.

ALEXANDER, GEORGE, Mayor of Los Angeles, Cal., has made the following appointments: Harbor Commission, T. E. Gibbons, Stoddard Jess and M. H. Newmark; Public Utilities Board, Meyer Lissner, Frank J. Hart and Paul Haupt; Civil Service Commission, Dr. John R. Haynes.

BRENNECKE, FRED H., Evansville, Ind., Chief of Police, has retired from office, after twenty-two years of service.

BYRNE, COL. JOHN, former Chief of Police of Buffalo, N. Y., died December 30, following a stroke of apoplexy, brought on largely by the recent death of his son, Cadet Eugene Byrne, of West point, who was killed in a football game.

CARDWELL, WILLIAM, Mayor of East Orange, N. J., has reappointed the members of the several commissions as follows: Police Commission, Edgar Sharp; Water Commission, Oscar H. Condit; Fire Commission, John Reeve; Excise Commission, Edward F. Allen; Playground Commission, Joseph P. Schiller; Board of Assessments, Stephen W. Oughéltree; Board of Assessors, Philip C. Williams; Board of Health, De Witt Cook; Library Trustees, Edward O. Stanley.

COOPER, JOHN C., Jacksonville, Fla., has been appointed City Attorney.

DILLON, BENJAMIN, Chief of the Fire Department, Louisville, Ky., died December 26 from injuries by being thrown from his rig.

EDWARDS, J. H., Mayor of Alexandria, Ind., has announced the reappointment of John Ellis as Chief of Police, John F. Merker as Chief of the Fire Department, and William G. Kelly as Street Commissioner. The new Board of Health will be composed of Isaac S. Kelly, Dr. A. R. Schaefer and Dr. E. J. Beardsley.

EMERSON, GUY C., Street Commissioner, Boston, Mass., has been appoined Commissioner of Penal Institutions, vice Vernon V. Skinner, removed.

FEENY, JAMES C., Mansfield, O., has been appointed by Mayor Brown as Chief of Police, to succeed J. W. Weil, resigned.

FLETCHER, AUSTIN B., Boston, Mass., Secretary of the Massachusetts Highway Commission, has resigned. The Commission will divide the duties of secretary and make other changes in its organization. Under the new plan Mr. Frank I. Bieler, of Boston, now assistant secretary, is promoted to secretary, and Mr. Arthur W. Dean, State Engineer of New Hampshire, is appointed to the newly created position of Chief Engineer. Mr. Dean, although now a resident of New Hampshire, was born in Taunton, Mass. He was a member of the class of 1892 of the Massachusetts Institute of Technology, and until 1895 was engaged in engineering work in Massachusetts. In the latter year he was elected city engineer of Nashua, N. H., which position he held until 1902, when he became the chief engineer of the New Hampshire Traction Company. In 1904 Mr. Dean was appointed State Engineer of New Hampshire, and has since held that position, the major part of his work relating to the State highways. He was active in mapping out the scheme for the system of trunk line highways recently adopted by that State. Mr. Bieler will have charge of the automobile and telephone departments of the commission, and Mr. Dean will take charge of the State highway work.

FYFFE, J. P., Chattanooga, Tenn., has been appointed Chief of Police of the Panama Canal Zone, to succeed Gilbert Porter.

GAYNOR, WILLIAM J., Mayor of New York City, has announced the following appointments:

CORPORATION COUNSEL—ARCHIBALD R. WATSON, member of the law firm of Nicoll, Anable & Lindsay, and Fuller editor of "Bench and Bar" and of the American Encyclopedia of Law.

COMMISSIONER OF DOCKS—CALVIN TOMKINS, prominent reformer, member of the Municipal Art Commission and persistent critic of abuses in administrative affairs.

COMMISSIONER OF WATER SUPPLY, GAS and ELECTRICITY—HENRY S. THOMPSON, building superintendent under Borough President Jacob A. Cantor during the Low administration; Commissioner of Public Works for a time under John F. Ahearn while the latter was being investigated; director in many prominent corporations, including the City Investing Co.; owner of the Marie Antoinette Hotel, and half owner of The Belnord.

FIRST DEPUTY COMMISSIONER OF WATER SUPPLY, GAS and ELECTRICITY—DR. EDWARD W. BEMIS, formerly Water Commissioner of Cleveland, O.

FIRE COMMISSIONER—RHINELANDER WALDO, former Deputy Police Commissioner under Commissioner Bingham and distinguished for gallant service in the Spanish War and the Filipino insurrection.

COMMISSIONER OF BRIDGES—KINGSLEY MARTIN, chief engineer of the Bridge Department and probably the foremost expert in the country on bridge building and maintenance.

CITY CHAMBERLAIN—CHARLES H. HYDE, prominent member of the Brooklyn bar and confidential adviser of Mayor Gaynor during the last campaign.

COMMISSIONER OF CHARITIES—MICHAEL J. DRUMMOND, director of the Emigrant Savings Bank and eminent philanthropist.

DEPUTY COMMISSIONER OF CHARITIES—JOHN W. KELLER.

HAWKINS, W. D., Flowery Branch, Ga., has been elected Mayor.

HOPKINS, JAMES R., Chief of the Somerville, Mass., Police Department, after fifty-three years' service in the Department, thirty-seven years as Chief, has retired on a pension of $1,200 a year.

HOWE, HARRY W. J., Lowell, Mass., has been dismissed by Mayor Brown as Charity Commissioner and John McManus named to succeed him.

KENNY, MICHAEL A., Bridgeport, Conn., has been appointed Director of Public Works, to succeed Charles F. A. Biltz.

LINXWEILER, JACOB, JR., of Dayton, O., Horace A. Irvin and J. Sprigg McMahon have been appointed by Mayor Burkhart members of the Park Commission.

MCCLAIN, A. S., Lonsdale, Tenn., has been elected Marshal.

MCGIVERN, DANIEL J., Chelsea, Mass., Albert K. Mann and Dr. George B. Fenwick have been appointed members of the Board of Health.

MCKENNA, MAURICE F., City Engineer of Bridgeport, Conn., has been reappointed.

MENVILLE, DR. C. M., Houma, La.; Dr. J. B. Duval, Dr. Hugh St. Martin, J. H. Hellier and A. M. Dupont have been elected members of the Board of Health.

MILLER, CLARENCE D. S., Bridgeport, Conn., has been appointed Police Commissioner, succeeding George E. Hill. Edward F. Hallen will succeed Thomas C. Coughlan.

MOZRALL, JOSEPH O., Littleton, N. H., has been appointed Chief of the Fire Department.

NEAL, M. W., Louisville, Ky., has succeeded Maj. William A. Colston as member of the Board of Public Works.

PHELAN, JAMES D., San Francisco, Cal., has resigned as Park Commissioner.

PLANT, F. S., Mayor of Minto, N. D., died December 25.

ROBERTSON, W. T., Forest, Miss., has been elected Marshal.

SCANLAN, MICHAEL F., Lawrence, Mass., has been appointed Building Inspector.

SCHREIBER, FREDERICH, Bridgeport, Conn., has been appointed Superintendent of Streets, to succeed John H. Colgan.

SHIPPS, CHARLES M., Carthage, Mo., Chief of the Fire Department, died December 18.

SMITH, R. E., Elljay, Ga., has been elected Mayor over V. A. Trammell.

SUNDMAKER, J. H., Chief Engineer of the Board of Public Service, will be appointed Director of Public Service by the new Mayor of Cincinnati, O.

TEAL, MISS HARRIET H., Auburn, N. Y., a social settlement worker, has been appointed by Mayor Thomas H. O'Neill as Commissioner of Parks.

WEBER, P. H., Canton, O., has been appointed Chief Engineer of the Board of Public Service, a position he held from 1899 to 1904.

WEST, WILLIAM J., Troy, N. Y., has been appointed Civil Service Commissioner, to succeed Marshall F. Hemmingway, who has been elected President of the Common Council. Other appointments are: Commissioner of Public Safety, Francis N. Mann, Jr.; Commissioner of Public Works, William H. Shields; Corporation Counsel, George B. Wellington; City Engineer, Edwin L. Grimes; Secretary to the Mayor, Roy V. Rhodes; Mayor's Executive Clerk, H. Bosworth McChesney; Superintendent of Water Works, Eugene S. Osborne. Each of the appointed officials who had appointments to make renamed their present forces in every instance.

WEED, HOWARD EVARTS, Chicago, Ill., delivered a lecture at Galveston, Tex., December 21 on "A More Beautiful Galveston." On December 22, at Muskogee, Okla., he delivered a lecture on "A More Beautiful Muskogee."

WOODS, WILLIAM S., Mayor of Taunton, Mass., has appointed Harrie L. Blood Chief of Police and D. Gardner O'Keefe City Solicitor.

INCORPORATIONS

Bradford Light, Heat & Power Co., Clearfield, Pa., capital, $5,000.

Dallas Township Electric Co., Plymouth, Pa., capital, $5,000.

The Eldorado Water & Power Co., Eldorado, Pa., capital, $20,000. Incorporators: W. B. Silliman, John R. Nasworthy, George E. Webb.

Evans City Light, Heat & Power Co., Evans City, Pa., capital, $5,000.

Flower City Concrete Construction Co., Rochester, N. Y., manufacture, operate and deal in concrete, etc., capital, $100,000. Incorporators: Henry C. Babel, Buffalo, N. Y.; George F. Love and Thomas Hough, Jr., both of Rochester, N. Y.

Independent Street Lighting Co., Boston, Mass., manufacturing and sale of gas and apparatus; capital, $50,000. Incorporators: Frank A. Butler, 83 Irving st., Everett; George C. Innis, 27 Clarkwood st., Mattapan.

The Industrial Engineering Co., Lawyers' Title and Trust Co., Atchison, Kan.; capital, $40,000. Incorporators: W. E. Priest, Burt H. Miller and Edgar S. Miller, all of Atchison, Kan.

National Engineering & Construction Co., New York, N. Y.; capital, $500,000. Incorporators: William S. McGuire, New York City; Joseph D. Fackenthal, Brooklyn, N. Y.; James W. Williams, Waston, Pa.

St. George Water Co., Camden, N. J.; supplying water; capital, $50,000. Incorporators: G. E. Allen, Camden; I. E. Archibald and R. Robinson, both of St. George, S. I., N. Y.

Standard Filtering Co., Jersey City, N. J.; to manufacture water filters; capital, $125,000. Incorporators: Barry L. Balch, 55 Boyd ave.; Charles R. Piper, George A. Piper, 239 Bergen ave., Jersey City.

Somerset Water Co., Peapack, N. J.; operate water works in Gladstone, Peapack, Far Hills, Bedminster and Puckamin Townships; capital, $100,000. Incorporators: G. R. Layton, W. V. D. Layton, G. H. Logan, J. W. Tuttle, S. C. Bloodgood, J. McLaughlin, Bedminster; N. T. Ballentine, Peapack; J. M. Harper, T. S. Hill, D. Hulick, W. H. Horton, D. B. Melock, Gladstone.

Terminal Power Co., Champaign, Ill.; to operate light and power plants; capital, $2,500. Incorporators: George M. Mattis, W. H. Carnham and B. E. Gramble, all of Champaign.

MUNICIPAL APPLIANCES

Hydraulic Concrete Stone Machine

The Fisher Hydraulic Stone and Machinery Company, Builders' Exchange Building, Baltimore, Md., manufactures a hydraulically operated press for the manufacture of concrete building material. The press is operated by a two-plunger pump, with high and low-pressure cylinders, which deliver a heavy pressure over the entire surface of the material. There are three strong adjustable cars mounted on a table revolving through the press, having three definite stops that places one mold box at the filling table, one in the press, and the third delivering the finished product. The three processes are going on at the same time.

The patterns or designs are attached in the bottom of the mold boxes and a wood pallet or board is placed along the front side of the box when it is ready for filling; when filled the table revolves one-third revolution, bringing the mold box to the press, and places another at the filling table; the operating valve closed, the platen or ram of press moves up carrying the mold box up against the pressure head, forming in a few seconds the shape of block desired; the pressure released, the box returns to the seating on the revolving table, and again a one-third revolution is made and the mold box is brought to delivery when the block is released; thus the action places one at the filling table, another in the press and the third delivering, all at the same time; when delivered, the mold box is closed and the pallet is placed in position and is again ready for filling; this should require about one minute for a complete revolution, and three finished blocks are made.

The patterns and equipments consist of heavy grey iron plates carefully machined and dressed in form for making panel, or bevel faces, corrugated, rock face or plain, water tables and cornices or for any other similar purpose.

The manufacturer's claims for the machine are:

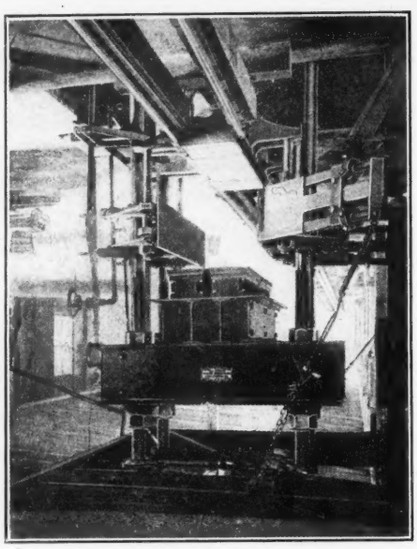
Large capacity—500 to 2,000 blocks a day.

Exceptional Quality—dense non-absorbent block, due to hydraulic pressure.

Wide Scope—A wide variety of styles can be made.

Handsome Appearance—The designs may be smooth, panel, corrugated, rock-face or fancy designs, and colored facing material may be used.

Economy—Both in labor and material.



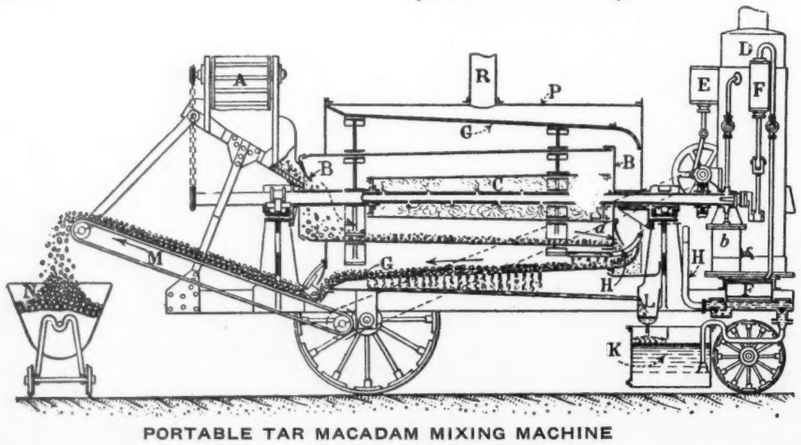
HYDRAULIC CEMENT PRESS

Portable Tar Macadam Mixer

The reproduction shown below is a portable tar macadam mixing machine said to be quite extensively used in France in building roads on the so-called Bolthauser system. This construction is desirable where a greater depth of tar-coated material is needed than is possible to obtain even by pouring tar in two coats. As the heating is done by steam, and temperatures obtained would not be high unless the machine where operated very slowly, its use is confined to tar mixtures susceptible of being worked at a temperature of not over 150° F. The machine is described in "Genie Civil," Paris.

The machine, which is portable and designed to be used immediately on the work, consists of a steam boiler and engines, a tar tank, rotating mixing and heating drums and elevators. The stone from the elevator A is delivered into the drum B and from that to drum G. In the first drum the stone is heated by steam from the cylinder C, which is fed through the hollow axle from the boiler D. Water of condensation collects in the receptacle a and runs back to the tank b. Tar is melted in the tank F and conveyed through pipe H to the drum G. M is a discharge elevator taking the coated stone from drum to wheelbarrows. Provision is made for recovering excess tar through the strainer L back to the tank.

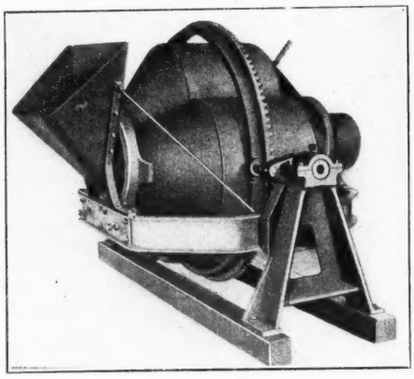
Portable machinery has been used in Europe in the construction of bituminous roads from about the beginning of the industry, but only within the last few years in this country.



PORTABLE TAR MACADAM MIXING MACHINE

Clover Leaf Concrete Mixer

The Clover Leaf Machine Co., South Bend, Ind., manufactures a batch mixer of unique design, for which special merit is claimed, particularly from the fact that it will mix comparatively dry concrete. The peculiar shape of the drum gives the machine its name. A vertical cross section has an outline resembling a clover leaf. As the drum revolves the mixture is carried along and falls of its own weight when it reaches a certain point. In falling the materials are turned over first as is done by a laborer mixing with a shovel. The involute curves of the mixer give the concrete three turns to each revolution of the drum. The ends of the drum are cone-shaped, which gives the materials a lateral motion toward the center. The machine is said to be easily kept clean, as it has no pockets. Clover Leaf mixers are made in 5, 7, 10 and 15-cubic feet sizes. The frame is of special design, made of channel steel. All bearings are provided with bronze bushings, together with hard oil cups for proper lubrication. The gears are strong and have a powerful purchase. The machine



CLOVER LEAF CONCRETE MIXER

is said to be lighter in weight than other batch mixers of equal capacity, a peculiarity worthy of consideration. The portable type is provided with a gasoline engine housed in. The engine is simple in construction, operating on the four-cycle hit-and-miss principle Their operation is claimed to be uniform and reliable.

Asphalt Sewer Pipe Joints

Asphalt joints for sewer pipe have certain advantages over cement joints which make them preferable for use under some conditions. As the asphalt is poured by a process similar to that employed in making lead joints in water pipes, an inspector viewing the joint from above can be reasonably sure that the joint is well made. In the case of a cement joint only by a careful inspection of the joint all the way around is it possible to be certain of its good workmanship. The asphalt joint properly made assures that no ground water can get into the sewer. The operation of making the asphalt joints, as practised in Findlay, O.; Monmouth, Ill.; Lamar, Col., and other cities where "Pioneer Waterproofing Asphalt," manufactured by the American Asphaltum and Rubber Co., Chicago, Ill., has been used, is as follows: The pipe after being lowered to place in the ditch is held with the spigot end centered in the bell of the preceding pipe while the oakum is firmly calked in place. An extra amount, if neces-

sary, may be packed at the lower part of the pipe so as to raise it slightly, making the clearance between pipe and bell uniform. A gasket known to the trade as "Asbestos Lead Joint Runner" made in square section is then placed around the bell, leaving an opening at the top through which the asphalt, heated to a temperature of 425° F., is poured. The gasket should be dusted with cement to avoid adhesion with the asphalt. Care must be taken to see that no water is left in the joint before pouring. This may be avoided by enlarging the bell hole in the bottom of the trench and dipping this free of water just before placing the next pipe. The gasket need be left in place only a few minutes. The cooling process may be aided by dipping water from the bell hole and pouring it over the joints. Two sections of pipe may be joined outside of the trench, if desired, and the two laid as one, thus reducing the number of joints to be made ni place by a half.

For work of this kind an ordinary asphalt cement, such as is commonly used in paving work, would not be suitable. A material having a high melting point and a low freezing point is desirable. The specifications of the American Asphaltum and Rubber Company insure such a product. Their principal requirements are: A practically pure bitumen, having over 30 per cent insoluble in petroleum naphtha; specific gravity not over .99 at 60° F.; should not contain over 4 per cent paraffine; melting point about 215° F.; must be ductile, waterproof, adhesive and pliable at comparatively low temperatures.

TRADE NOTES

Cast-Iron Pipe.—Chicago: Prices remain unchanged. Quotations: 4-inch, $28.50: 6 to 12-inch, $27.50; 16-inch and up, $26.50. Birmingham: Recent lettings have been of such volume as to place all producers in comfortable circumstances as to orders and little additional business will be solicited at prices now asked. Quotations: 4 to 6-inch, $26; 8 to 12-inch, $25; over 12-inch, average, $24. New York: Prospects are excellent for continued good business.

Lead.—Lead continues strong, although there is not a great amount of buying. The American Smelting and Refining Company is still asking 4.70c and outside interests are asking and getting in some cases as much as 4.75c. The market is a little softer in St. Louis, but the independent sellers are still in control of the situation there. Last week some of them were getting the same price as prevailed in the New York market, but now lead can be bought there for 4.65c. This is still too high to permit the shipment of lead from the West at a profit.

Culverts.—The Hennepin Bridge Co., Minneapolis, Minn., manufacturer of culverts, will establish a branch at Fargo, N. D., for the distribution of its product. Orders from the West received before the Fargo plant is ready will be taken care of at the Minneapolis plant.

Westrumite.—The Board of General Appraisers has changed the classification of Westrumite, a liquid road binder, by having it considered as "asphalt and bitumen if dried or otherwise advanced in any manner," and thereby dutiable at the rate of $3 per ton. Hitherto the duty has been assessed at 30 per cent ad valorem.

Chicago Railroad Merger.—Details of the plan of financing the Chicago City & Connecting Railways, the name of the holding company which has taken over all the transportation lines in the South Division of the city, have been announced by Ira M. Cobe. The amount of the bonds to be issued, including first mortgage bonds now outstanding, is less than the actual valuation of the properties, based on the amount the city would have to pay were it to take over the lines under the terms of the franchises. The earnings of the properties are estimated at two and one-third times the amount required to meet the interest on the bond issues, and the whole property is to be taken over on a 4 per cent basis on a capitalization of $62,000,000. The bonds of the new company have all been underwritten and some of them already sold. The unsold portion will be offered in New York and Chicago at public subscription in a few days by J. P. Morgan & Co., the Illinois Trust and Savings Bank and First Trust and Savings Bank.

Cement for Spokane.—New York, Chicago and Spokane capitalists have financed the People's Portland Cement Company, incorporated for $2,000,000, to erect and operate a 2,000-barrel plant, costing $500,000, at Squaw Bay on Lake Pen d'Oreille, 60 miles northeast of Spokane. Arthur S. Ford, of New York, and H. A. Groth, of Chicago, announce that contracts will be awarded in a few days for a steel and concrete plant with three kilns to be in operation next August, when cement will be laid down in Spokane at $2 a barrel. The present cost of cement, of which more than 1,000,000 barrels are used annually in Spokane and the adjoining territory, is from $2.75 to $3.50 a barrel, including freight charges, the bulk of the supply coming from Kansas and Canada, the rest from points on the Pacific Coast. Cement is higher in Spokane at present, experts say, than in any other city in the United States.

Office Building at Plant.—The United States Cast Iron Pipe and Foundry Company, Buffalo, is building at its plant on the New York Central Railroad Belt Line and Box avenue a two-story office building of stone, brick and structural iron.

Valve Company Enlarges.—The Pittsburg Valve and Fittings Company is adding a wing to its malleable iron department at Barberton, Ohio, which will be completed early next year.

Contractors' Supplies.—Harold L. Bond Co. announces, on a folder of a design that can hardly fail to attract attention, that it has taken new quarters at 383-391 Atlantic avenue, Boston, Mass. Here, the company says, it will carry the largest stock in New England of derrick fittings, wheel-barrows, engines, concrete mixers, blasting supplies, paving tools, shovels, boilers, pumps, rock drills, quarry tools, etc.

Calendars.—THE MUNICIPAL JOURNAL AND ENGINEER acknowledges the receipt of the following calendars:

Morris Machine Works, Centrifugal Pumping Machinery, Baldwinsville, N. Y.—Reproduction, 16x20 inches, of a scene in the Yellowstone Park by Thomas Moran.

Edison Portland Cement Co., New Village, N. J.—Large wall calendar. The sheet for each month contains a statement of some important fact regarding cement which every cement worker should know.

Universal Portland Cement Co., Chicago, Ill.—The trade mark of the company is reproduced on a background of concrete with handsome pebble finish, a suitable reminder throughout the year of the possibilities of concrete.

Paterson Call.—A suitable wall calendar in the same style which they have followed for a number of years.

Auto Chemical.—The Consolidated Motor Car Company, San Francisco, Cal., has received a Pope-Hartford combination chemical and squad wagon which will be used to demonstrate to fire departments of neighboring towns the merits of this type of apparatus. It is a 40-horsepower machine with a speed of 40 miles an hour. The chemical tank has a capacity of 50 gallons. An extension ladder that can be pulled out to 50 feet and other equipment are carried.

Demountable Pneumatic Tire for Fire Apparatus.—While it is true that the great majority of motor trucks are equipped with solid rubber tires—giving excellent service—the new pneumatic truck tire and demountable rim, recently placed on the market by the Diamond Rubber Company, will undoubtedly be the equipment on many motor trucks the coming year. In the past the one great objection to pneumatic tires for heavy truck work has been that, particularly on the rear wheels, where the load and strain are usually greatest, tires of sufficient size could not be built. This objection has been overcome by the dual feature of the Diamond pneumatic tire for rear equipment. For the front wheels the tire is simply a single one—of the "Diamond wrapped" construction—fitted to a regular Diamond demountable rim. These single tires are, of course, made in any desired size. The dual tires and demountable rims are, as the name implies, simply two wrapped tread pneumatic tires on demountable rims. These can also be made in any size desired, but are not recommended under 4-inch. It can readily be seen that with the dual tires a treading surface is offered larger than any single tire could have (for instance, a 5-inch dual would be two 5-inch tires, having a tread surface of 10 inches) and also far better traction is assured. The resiliency of these tires, their tough wear-resisting qualities, and the simple method of applying a fresh already inflated tire when a puncture occurs will no doubt result in a continued increase in the use of them. Particularly are they well adapted to chemical fire engines and apparatus where speed and "easy riding" are important factors.

Fire Hose.—The Eureka Fire Hose Company of New York recently called a meeting of its officers and selling force to talk over the unusual business conditions resulting from the increase of the cost of the raw materials from which their product is made, rubber and cotton. It was unanimously agreed that rather than deteriorate the quality of their brands, that the selling price be advanced. The following officers and employees were present:

B. L. Stoew, President; I. B. Markey, Vice-President; G. A. Wies, Treasurer and General Manager; N. F. McKeon, Secretary and General Factory Manager; F. R. Grady, Assistant to General Factory Manager; P. O. Hebert, Atlanta, Ga.; L. S. Russell, Dallas Texas; H. F. Pratt, Columbus, Ohio; C. H. Dixon, Fargo, N. D.; E. M. Yarrell, Kansas City, Mo.; M. J. Burke, Syracuse, N. Y.; W. P. Burke, Syracuse, N. Y.; G. F. Hand, Chicago, Ill.; F. P. Hoy, Minneapolis, Minn.; W. E. McGuffin, Minneapolis, Minn.; J. M. Hardy, Boston, Mass.; A. T. Shearer, Omaha, Neb.; James Quinlan, New York City; P. W. Outwater, New York City.

Pump Works Addition.—The Snow Steam Pump Works, Buffalo, N. Y., is making plans to add to its plant at Roberts avenue and the Pennsylvania Railroad a machine shop, 80 x 200 feet, steel frame and brick, with sawtooth roof.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals

It is our purpose to give in the first issue of each month a list of all articles of any length or importance which have appeared in all the American periodicals and the leading English, French and German ones, dealing more or less directly with municipal matters. The index is kept up to date, and the month of literature covered each time will be brought up to within two or three days of publication. Our chief object in this is to keep our readers in touch with all the current literature on municipal matters. In furtherance of this we will furnish any of the articles listed in the index for the price named after each article, except that where an article is continued in two or three issues of the paper, the price given is for each of said issues. In addition to the titles, where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its contents is added. The length also is given, and the name of the author when it is a contributed article.

ROADS AND PAVEMENTS

Good Roads Movement in the South. By Jos. H. Pratt. 9 pp., Annals American Academy of Political and Social Science, January. $1.00.

Improved Highways and How to Secure Them. By Chas. H. Hoyt. 13 pp., Cornell Civil Engineer, December. 20 cts.

Construction of Our Country Highways. Paper before Highway Convention of Tennessee. By James M. Head. 1 p., Good Roads, December. 10 cts.

History of Road Building in the United States. Paper before First American Congress of Road Builders. By E. L. Powers. 2½ pp., Good Roads, December. 10 cts.

Extracts from papers before the British Road Conference of 1909. 5 pp., Engineering News, Dec. 16. 15 cts.

Highway Expert Tells of Roads in Norway. By Geo. Cooley. 1 p., Contractor, Dec. 15. 20 cts.

Boulevards. Paper before First American Congress of Road Builders. By Samuel C. Lancaster. 1 p., Good Roads, December. 10 cts.

State Highway Laws and Roads, New York. Paper before Good Roads Convention. By Geo. C. Diehl. 1 p., Good Roads, December. 10 cts.

New York State Road Work. Paper before Good Roads Convention. By S. Percy Hooker. 1½ pp., Good Roads, December. 10 cts.

Standard Details of the New York State Highway Department for State and County Roads. Illustrated, 1½ pp., Engineering-Contracting, Dec. 17. 15 cts.

Road Construction in California, Methods of. Paper before American Road Makers' Association. By H. R. Postle. 1 p., Contractor, Dec. 1. 20 cts.

Road Materials and Some Simple Rules for Testing Them. Paper before First American Congress of Road Builders. By Austin B. Fletcher. 3 pp., Good Roads, December. 10 cts.

Oiling Park Roads of Kansas City, Method and Cost of. Plant for unloading cars. Illustrated, 1 p., Engineering-Contracting, Dec. 1. 10 cts.

Methods and Cost of Sprinkling Road Surfaces with Oil. By W. A. Gillette. Illustrated, 1 1-3 pp., Engineering-Contracting, Dec. 8. 10 cts.

Recent Experience with Crude Oil in Sacramento. By Mayor C. L. White. 9 pp., Pacific Municipalities, November. 10 cts.

Tarring, Road. Temporary and permanent improvement. Surface and penetration methods. Quantities of materials required. Tar-spreading machines. Tar macadams. 1½ pp., Municipal Journal and Engineer, Dec. 8. 10 cts.

Bituminous Pavements on a Macadam Base. Paper before American Society of Municipal Improvements. By Linn White. 1½ pp., Contractor, Dec. 15. 20 cts.

Construction and Preservation of Macadam and Bituminous Macadam Roads. Paper before Western Society of Engineers. By L. W. Page. 1 p., Engineering News, Dec. 9. 15 cts.

Manipulation Factors in the Valuation of Paving Cement. Paper before American Society of Municipal Improvements. By L. Kirschbraun. 2-3 p., Engineering-Contracting, Dec. 1. 10 cts.

Specifications of the New York State Highway Department for Bituminous Macadam. Characteristics required of the bituminous material. 2 pp., Engineering-Contracting, Dec. 8. 10 cts.

Bituminous Road Materials. Paper before Good Roads Convention. By Prevost Hubbard. 3 pp., Good Roads, December. 10 cts.

Utilizing Existing Macadam as a Base for Permanent Bituminous Pavement. Paper before American Society of Municipal Improvements. By Linn White. 1 1-3 pp., Engineering-Contracting, Nov. 24. 10 cts.

Railway Crossings. By A. W. Campbell. Illustrated. 3 pp., Municipal World, December. 10 cts.

Unique Type of Crossing for Track Elevation. Illustrated, 1 p., Contractor, Dec. 15. 20 cts.

Street Construction Details. ¼ p., Municipal Journal and Engineer, Dec. 15. 10 cts.

Concrete Wall at Chattanooga. Unusual construction at the intersection of hillside streets. Detailed plans. Illustrated, 4½ pp., Municipal Journal and Engineer, Dec. 1. 10 cts.

Regrading the Streets of Seattle. Illustrated, 4 pp., Good Roads, December. 10 cts.

Boning Rod for Crowning Streets, New Style of. By O. E. Noble. Illustrated, ½ p., Engineering-Contracting, Dec. 17. 15 cts.

Street Grade Calculating. Account of an instrument and method devised by O. E. Noble, city engineer of Hobart, Okla. Illustrated, ¾ p., Municipal Journal and Engineer, Dec. 29. 10 cts.

Pavements and Grade Limitations. Kinds of pavements which have been found satisfactory for specified grades in New York City. Costs of construction. Paper before American Society of Municipal Improvements. By S. C. Thompson. 1½ pp., Municipal Journal and Engineer, Dec. 8. 10 cts.

Crowns of Roadway Pavements. Paper before American Society of Municipal Improvements. By Geo. C. Warren. 1½ pp., Good Roads, December. 10 cts.

Paving Practice with Respect to Crowns of Roadway Pavement and Concrete Foundations. Paper before American Society of Municipal Improvements. By George C. Warren. 1½ pp., Engineering News, Dec. 2. 15 cts.

Width of Roads. By F. W. W. Doane, city engineer, Halifax 2 pp., Canadian Municipal Journal, December. 10 cts.

Sidewalks, Cement Tile for. Practice in Atlanta, Ga. ½ p., Municipal Journal and Engineer, Dec. 1. 10 cts.

Locating Sidewalks next to curb. Arguments for and against. ¼ p., Municipal Journal and Engineer, Dec. 1. 10 cts.

Center Walks Supplemented by Back Alleys in Place of Roadways and Sidewalks in Venice, Cal. By H. M. Meinell. Illustrated, ½ p., Engineering News, Dec. 2. 15 cts.

Novel Streets of Venice, Cal. By H. M. Meinell. Illustrated, 2 pp., Pacific Municipalities, November. 10 cts.

Draining Street Intersections. Devices where storm sewers are absent and where present. Box and pipe gutter culverts. Inlets and bridges. Paper before American Society of Municipal Improvements. By S. D. Newton, city engineer, Knoxville, Tenn. Illustrated. 1¾ p., Municipal Journal and Engineer, Dec. 29. 10 cts.

Drainage at Street Intersections. Various types of culverts used in surface drainage. Iron plate coverings. Paper before American Society of Municipal Improvements. By J. H. Weatherford. Illustrated, 4½ pp., Municipal Journal and Engineer, December 15. 10 cts.

Foundations. Cost of concrete pavement. Figures from several cities where mixing machines are used. ½ p., Municipal Journal and Engineer, Dec. 1. 10 cts.

Concrete Foundations from Paving Blocks. Large contract in New York City in which an asphalt pavement laid on stone blocks was repaved, the stones being crushed for concrete. Illustrated, 3¾ pp., Municipal Journal and Engineer, Dec. 1. 10 cts.

Concrete Pavement Foundations. Advocating lighter foundations except over weak spots. Grades sizes of aggregates to save cement. Poured concrete foundations. Paper before American Society of Municipal Improvements. By Geo. C. Warren, 1¾ pp., Municipal Journal and Engineer, Dec. 1. 10 cts.

Asphalt Paving and Some Present Needs. Paper before American Society of Municipal Improvements. By H. Tipper. 1¾ pp., Contractor, Dec. 1. 20 cts.

Control of Workmanship on Asphalt Pavements. By L. Kirschbraun. 1 p., Canadian Engineer, Dec. 17; 1¼ pp., Dec. 24. 15 cts.

High Cost of Asphalt Repairs in New Orleans. 1½ pp., Engineering-Contracting, Nov. 24. 10 cts.

Method of Preventing the Breaking up of Soft Surface Pavements in Repairs to Street Railway Tracks. 1-3 p., Engineering-Contracting, Nov. 24. 10 cts.

Asphalt Block in Savannah. Pavement laid without foundation. Method of preparing sand in sub-soil. Illustrated, ¾ p., Municipal Journal and Engineer, Dec. 15. 10 cts.

Concrete Pavement in Boise. Materials used and method of construction in contract work. Expansion joints. Costs. Paper before American Society of Municipal Improvements. By J. B. Marcellus, city engineer. ¾ p., Municipal Journal and Engineer, Dec. 1. 10 cts.

Concrete Blocked Pavement. Laid in Knoxville, Tenn., by the Knoxville Railway and Light Co. Method of construction, machinery and tools used. By W. E. Putnam. Illustrated, 4½ pp., Municipal Journal and Engineer, Dec. 1. 10 cts.

Possibilities of Portland Cement as a Road Material. Paper before Association of American Portland Cement Manufacturers. By Logan W. Page, 2-3 p., Engineering News, Dec. 23. 15 cts.; 1 p., Engineering Record, Dec. 25. 10 cts.

Brick-Paved Streets of the Pacific Northwest. Illustrated, 1½ pp., The Clay-Worker, November. 25 cts.

Care in the Construction of Vitrified Brick Streets. By W. P. Blair. Illustrated, 2 pp., Engineering News, Nov. 25. 15 cts.

Standard Specifications of the New York State Highway Commission for Brick Pavement. Illustrated, 1½ pp., Engineering-Contracting, Dec. 17. 15 cts.

Slag Successfully Used as a Road Material. 1 p., Contractor, Dec. 1. 20 cts.

Cost of City Pavements. Paper before American Society of Municipal Improvements. By C. H. Rust. Illustrated, 2½ pp., Canadian Engineer, Dec. 17. 15 cts.

Itemized Costs of City Pavements in Toronto. From paper before American Society of Municipal Improvements. By C. H. Rust. 1½ pp., Contractor, Dec. 1. 20 cts.; 1½ pp., Contract Record, Dec. 1. 20 cts.

Lessons Taught by the High Costs of Pavement Repairs Done by Day Labor in Brooklyn. 1 1-3 pp., Engineering-Contracting, Dec. 1. 10 cts.

SEWERAGE AND SANITATION

Sewer Construction in San Francisco. By O. D. Johns, Department of Public Works. Illustrated, 2 pp., Engineering Record, Nov. 27. 10 cts.

Construction of the Bronx Storm Relief Sewer. Detailed description. Illustrated, 2 2-3 pp., Engineering Record, Dec. 4. 10 cts.

Day Labor Costs of Sewer Construction in Boston in comparison with contract prices. 1 p., Engineering-Contracting, Nov. 24. 10 cts.

Concrete Sewers in Atlanta. Built by convict labor. Basket-handle shape preferred to circular. Low cost of materials. Illustrated, 1½ pp., Municipal Journal and Engineer, Dec. 1. 10 cts.

Cement in Sewerage Structure. Foreign practice. By R. E. McDonnell. ½ p., Municipal Journal and Engineer, Dec. 1. 10 cts

Sewer Inverts, Materials for. Paper before American Society of Municipal Improvements. By E. S. Rankin, superintendent of sewers, Newark, N. J. Illustrated 2-3 p., Engineering Record, Dec. 4. 10 cts.

Asphalt Joints for Sewer Pipe. By Carl Henneking, Municipal Building Engineer, Elberfeld, Germany. Illustrated, ¾ p., Engineering Record, Dec. 25. 10 cts.

Sea Outfall Sewer at Aberdeen, Scotland. Illustrated, 1½ pp., Engineering Record, Dec. 25. 10 cts.

Creek Valley Bed for a City Sewer, Utilizing a. By Harlow Gale, Minneapolis. Illustrated, 2-3 p., Engineering Record, Dec. 25. 10 cts.

Catch Basins, Cost of, from paper before American Society of Municipal Improvements. By G. H. Weatherford, City Engineer, Memphis, Tenn. ½ p., Contractor, Dec. 1. 20 cts.

Damages for Sewer Overflow. Decision against an Indiana city. ¼ p., Municipal Journal and Engineer, Dec. 29. 10 cts.

Cesspool and its Dangers. Paper before American Society of Inspectors of Plumbing and Sanitary Engineers. By B. J. Ashley. 2½ pp., Water and Gas Review, November. 20 cts.

Sewer Gas Not the Cause of Disease. 2-3 p., Water and Gas Review, November. 20 cts.

Sewer Gas in New York City, Explosions of. By A. A. Breneman. 1 1-3 pp., Engineering News, Dec. 2. 15 cts.

House Drainage and Sewage Disposal. Paper before Architectural Association. By W. D. Scott-Moncrieff. 2 pp., Surveyor, Nov. 12. 20 cts.

Sewage Disposal at Country Houses. Paper before Institution of Sanitary Engineers. By J. D. Watson. 1 2-3 pp., Engineering Record, Dec. 18. 10 cts.

Sewage Disposal. Choice of filter material. 2 pp., Canadian Engineer, Dec. 17. 15 cts.

National and State Control over Sewage Disposal. ½ p., Engineering Record, Dec. 25. 10 cts.

Sewage Disposal. Comment on recent address of J. D. Watson. 2-3 p., Contract Journal, Nov. 24. 20 cts.

Sewage and Garbage Disposal, and Water Works for Small Cities and Towns. By C. E Moore. 3 pp., Pacific Municipalities, November. 10 cts.

Sewage Disposal. Removal of Putrescibility. Distributing Appliances. Illustrated, 2½ pp., Canadian Engineer, Nov. 26. 15 cts.

Experimental Investigation of the Sewage Disposal of Ithaca, N. Y. By J. W. McKee. 6 pp., Cornell Civil Engineer, November. 20 cts.

Sheffield Sewage Works. Description of old and new works. Illustrated, 3 pp., Contract Journal, Nov. 17. 20 cts.

Factors Influencing the Selection of a Scheme of Sewage Treatment. Paper before Association of Managers of Sewage Disposal Works. By Sidney R. Lowcock. 1½ pp., Surveyor, Dec. 10. 20 cts. ½ p., Contract Journal, Dec. 15. 20 cts.

A New Method of Sewage Purification. Experiments of Dr. C. H. Rouchy at the Seine Sanitation Institute. 1 p., Indian Public Health, November. 25 cts.

Screens and Screening in Sewage Disposal. Description of automatic screens invented by E. S. Law, England. 1-3 p., Contract Journal, Dec. 8. 20 cts.

Tanks, Sewage Clarification. Two recent German devices, one operating by siphon action, the other by sedimentation. Illustrated, 1½ pp., Municipal Journal and Engineer, Dec. 8. 10 cts.

Triple Tank System of Sewage Treatment. Illustrated, 2 pp., Surveyor, Nov. 26. 20 cts.

Cameron Patent, Expiration of. ¼ p., Municipal Journal and Engineer, Dec. 8. 10 cts.

Disinfection of Sewage. Modern rapid sewage treatment. Inefficient in bacterial removal. Disinfection for destroying bacteria. Materials, methods and costs. Electrolytic methods. Paper before American Society of Municipal Improvements. By Earle B. Phelps. 2½ pp., Municipal Journal and Engineer, Dec. 22. 10 cts.

Disinfection of Sewage and Sewage Filter Effluents. By E. B. Phelps. Reviewed by H. C. H. Shenton. 2 pp., Surveyor Dec. 3. 20 cts. 1½ pp., Surveyor, Nov. 26. 20 cts.

Effluents, Purity of Sewage. Comment on paper by Gilbert J. Fowler before Royal Sanitary Institute. ½ p., Engineering Contracting, Dec. 8. 10 cts.

Quality of Effluents in Relation to Standards. Paper before Royal Sanitary Institute. By Gilbert J. Fowler. 2 pp., Canadian Engineer, Dec. 10; 1 p., Dec. 17. 15 cts. 3 pp., Surveyor, Nov. 19. 20 cts.

Standard for Sewage Effluents. Paper before Association of Managers of Sewage Disposal Works. By John C. Thresh. 2 pp., Surveyor, Dec. 17. 20 cts. ½ p., Contract Journal, Dec. 15. 20 cts.

Standards of Purification of Sewage Disposal Effluents. 1 1-3 pp., Engineering Record, Dec. 11. 10 cts.

Chemistry and Bacteriology of Sewage Purification. From paper before Society of Engineers. By Dr. David Sommerville. 1 p., Canadian Engineer, Dec. 3. 15 cts. 1 p., Surveyor, Nov. 12. 20 cts.

Experiments on the Passage of Bacteria Through Soil. Account of Experiments carried on by the city of Berlin.. Translated from paper in Gesundheits-Ingenieur. By Dr. Fritz Ditthorn and Dr. Arthur Luerssen. Illustrated, 1 p., Engineering Record, Dec. 4. 10 cts.

River Pollution and Water Purification. Conditions in Great Britain and America contrasted. 2-3 p., Engineering Record, Dec. 18. 10 cts.

Canadian Senate and River Pollution. 1 p., Canadian Engineer, Dec. 10. 15 cts.

Sanitation, Education in Municipal. By Prof. H. N. Ogden. 4½ pp., Cornell Civil Engineer, November. 20 cts.

Sanitation and the Death Rate. 2-3 p., Contract Journal, Dec. 1. 20 cts.

Water Pollution, Street Dust and Sanitation. ¼ p., Municipal Journal and Engineer, Dec. 8. 10 cts.

Improvement of City Slums. Comment on paper delivered before Royal Sanitary Institute. 1 p., Contract Journal, Nov. 24. 20 cts.

Strength of Being Clean as Applied to Cities. By David S. Jordan. 2 pp., Pacific Municipalities, November. 10 cts.

Life, The Waste of Infant. Conditions in New York and other large cities. By Edward T. Devine. Illustrated, 7 pp., Survey, Dec. 4. 25 cts.

Sanitary Engineer in Relation to the Chemist. Extracts from paper by M. G. E. Farmer. ½ p., Canadian Engineer, Dec. 24. 15 cts.

Oriental Sanitary Engineering. From paper before Institute of Sanitary Engineers. By C. T. Evennette. 2 pp., Surveyor, Nov. 12; 1½ pp., Nov. 19. 20 cts. 1½ pp., Contract Journal, Nov. 17. 20 cts.

Poverty and Public Health, Relations of, as Analyzed in the Minority Report of the Poor Law Commissioners. By B. G. Bannington. 1 p., Municipal Journal, Nov. 26. 15 cts.

Yellow Fever, Prophylaxis of. Authoritative complete statement of practical means by which yellow fever has been eradicated in Rio de Janeiro. By Consul-General G. E. Anderson. 3 pp., Public Health Reports, Nov. 19. 10 cts.

Tuberculosis, Testing Cows for. By A. W. Bitting. 1 p., Indiana State Board of Health, September. 5 cts.

Dangers of Street Dust. Abstract of Bulletin of Bureau of Labor. Exposure to dust induces consumption. Sprinkling or flushing recommended. 1 p., Municipal Journal and Engineer, Dec. 8. 10 cts.

State Health Boards, Results obtained by. What Pennsylvania and New Jersey are doing to purify their streams. What state laws authorize and to what extent they are being enforced. By Samuel G. Dixon, Commissioner Department of Health, Pennsylvania, and H. M. Herbert, chief engineer, Division of Surveys and Water Supply, New Jersey Board of Health. 1½ pp., Municipal Journal and Engineer, Dec. 8. 10 cts.

Report of Health Department of Indiana on Foods and Drugs. By H. E. Barnard. 11 pp., Bulletin of Indiana State Board of Health, September. 5 cts.

Public Health and Marine Hospital Service in 1909. Summary of Transactions of the. 8 pp., Public Health Reports, Dec. 10. 10 cts.

New York City, Report of Department of Health of, for the year 1908. 181 pp., City Record, Nov. 23. 5 cts.

WATER SUPPLY

Water Works, Yonkers, a brief sketch. 1½ pp., Fire and Water, Nov. 17. 10 cts.

The Water Supply of Springfield, O. By Paul Hansen, Acting Chief Engineer, Ohio State Board of Health. Description of the present water supply and the quality of the water. Illustrated, 3 pp., Engineering Record, Dec. 11. 10 cts.

Toronto Water Supply and Waste. 1½ pp., Canadian Engineer, Nov. 26. 15 cts.

Poughkeepsie Water Works. By Dr. John T. Otis. Illustrated, 17 pp., Journal New England Water Works Association, September. $1.00.

Omaha City Water Works. Account of recent construction. By Geo. B. Saunders. ½ p., Municipal Journal and Engineer, Dec. 15. 10 cts.

Report of Cleveland Water Works. By E. W. Bemis, Superintendent. 2-3 p., Fire and Water, Dec. 1. 10 cts.

Report of the Department of Water Supply, Gas and Electricity of New York City for year 1908. 114 pp., City Record, Nov. 20. 5 cts.

Developments of the Camaguey Water Works. By Henry A. Young. Illustrated, 19 pp., Journal New England Water Works Association. September. $1.00.

A Water Supply from a High Reservoir by Means of a Conduit and a Lower Reservoir. By P. Aristide Berges. Illustrated, 3 pp., La Technique Sanitaire, November. 50 cts.

Catskill Water Supply System. General Account. Illustrated, 2 pp., Fire and Water, Dec. 15. 10 cts.

The Kensico Reservoir, Catskill Water Supply. Proposed plans. Illustrated, 1½ pp., Engineering Record, Dec. 25. 10 cts.

The Hill View Reservoir, Catskill Water Supply. Description of reservoir to be located at the southerly end of the Catskill Aqueduct, near Yonkers, N. Y. Illustrated, 1 p., Engineering Record, Dec. 18. 10 cts.

Proposed Delivery System of the Catskill Water Supply. Account of tunnel to be built under New York City. Illustrated, 1 1-3 pp., Engineering Record, Dec. 11. 10 cts.

Proposed Water Supply Tunnel under New York City. ¾ p., Engineering News, Dec. 9. 15 cts.

Pipe Line of the Canon City Water Supply System. Detailed description. Illustrated, 3½ pp., Engineering Record, Dec. 4. 10 cts.

German Methods in the Manufacture of Cast-Iron Pipe. Illustrated, 1¾ pp., Iron Age, Dec. 16. 15 cts.

Methods and Costs of Laying about 1¼ miles of 20-inch cast-iron water pipe in Cuba. 1 p., Engineering-Contracting, Dec. 8. 10 cts.

Cost of Laying Water Mains at Cheyenne. By H. G. Porak, Asst. City Engineer. 1-3 p., Engineering Record, Dec. 4. 10 cts.

On the Depth of Laying Water Pipe. Report to New England Water Works Association. 1 p., Engineering News, Dec. 23. 15 cts.

Pressure and Flow in Water Distribution Systems, Control of. Illustrated, 1 1-3 pp., Engineering-Contracting, Dec. 1. 10 cts.

Wells Decision, East Orange Water. Decision of New Jersey Court regarding the diversion of subsurface and surface waters from adjoining land by the operation of a municipal well. 2-3 p., Engineering Record, Dec. 4. 10 cts.

Water Power Diversion. Data Relating to Awards for Water, and Report of Committee to New England Water Works Association. 2 pp., Engineering News, Dec. 16. 15 cts.

Great Lakes, Waters of the. Chemical analyses indicating extent of contamination. By R. B. Dole. 9 pp., Journal New England Water Works Association. September. $1.00.

Lake Currents Near Toronto. Description of apparatus used and results obtained. By F. W. Thorold. Illustrated, 2½ pp., Canadian Engineer, Dec. 3. 15 cts.

Valves, Cost of Municipal. From Metcalf and Eddy's Report on Boston Water Works. 1 p., Fire and Water, Dec. 15. 10 cts.

Meters, Huge Venturi. Registering 625 cu. ft. per second. Divi Island Pumping Plant, Madras, India. Illustrated, 1½ pp., Engineering News, Nov. 25. 15 cts.

Experiments with Double Pitot Tubes for the Purpose of Determining their value in measuring the flow of water. From paper before Society of German Engineers. By K. Ellon. Illustrated, 1 p., Engineering Record, Nov. 27. 10 cts.

Meter Boxes, Outdoor. Construction common to southern cities. Vitrified clay sewer pipes and special pipe used. Advantages of outside meters. Illustrated, ¾ p., Municipal Journal and Engineer, Dec. 15. 10 cts.

Weir Measurements in Open Streams, Making. How to build the ordinary rectangular weir and modifications of the standard weir. Comparing the flow of water over weirs and dams. By Franklin Van Winkle. Illustrated, 4½ pp., Power, Dec. 28. 5 cts.

Standpipes Painted, Keep. Precaution necessary to avoid collapse. ¼ p., Municipal Journal and Engineer, Dec. 29. 10 cts.

Reservoirs, Automatic Street. By F. S. Rodrigues De Brito. Illustrated, 10½ pp., La Technique Sanitaire, November. 50 cts.

Concrete in Water Works Construction. Paper before American Water Works Association. By Wm. Curtis Maybee. 3 pp., Water and Gas Review, December. 20 cts.

Pumping, New Apparatus for. An internal combustion device. From paper before Institution of Mechanical Engineers by H. A. Humphreys. ½ p., Engineering Record, Dec. 25. 10 cts. Illustrated, 2 pp., Engineering News, Dec. 2. 15 cts.

Notable Record of a Plant Pumping with Diesel Engines, Divi Island Station, Madras, India. 2-3 p., Engineering News, Nov. 25. 15 cts.

Efficiency of the Centrifugal Pump. Three methods of calculating. By John B. Sperry. 4½ pp., Surveyor, Nov. 23.

Coal Purchases for the New York Water Works. 1 p., Engineering Record, Nov. 27. 10 cts.

Maintenance and Operation, Water Works. Data from Water Commissioner's Report, Boston, for 1909. 1 1-3 pp., Engineering-Contracting, Dec. 8. 10 cts.

Filing and Indexing System of the Board of Water Supply of the City of New York. By Alfred D. Linn. 35 pp., Journal of the Association of Engineering Societies. October. 30 cts.

Filtration, Modern Mechanical. Description of Plant at Oneonta, N. Y. 1 2-3 pp., Fire and Water, Dec. 1. 10 cts.

Mechanical Water Filtration. Definition of term. ½ p., Municipal Journal and Engineer, Dec. 15. 10 cts.

Construction of Toronto's New Filtration Plant. Illustrated, 3 pp., Contract Record, Dec. 1. 20 cts.

Regulation Limited, Municipal. Recent Court Decision. ¾ p., Electric Railway Journal, Dec. 25. 10 cts.

Education in Municipal Filtration. By H. N. Ogden. 1 p., Fire and Water, Dec. 1. 10 cts.

Toledo Filtration Plant. Illustrated, 3½ pp., Cement World, December. 15 cts.

New Water Filtration Plant, Toledo, O. with data on contract methods and cost. By B. M. Baker. Illustrated, 4½ pp., Engineering-Contracting, Dec. 1. 10 cts.

Policy of Water Filtration. From paper before New York Association of Private Water Companies. By Geo. C. Whipple, 1½ pp., Engineering Record, Dec. 25. 10 cts.

Some Reservoir Filtration Costs and Methods. From annual report of J. J. Morrow on the Washington plant. 2-3 p., Engineering-Contracting, Dec. 22. 10 cts.

Design and Operation of a Mechanical Filter Plant. Description of the Bristol-Warren Water Works Company's new 2-million-gallon plant. Illustrated, 2 2-3 pp., Engineering Record, Dec. 18. 10 cts.

Cleaning Water Filters. Paper before Engineers' Club of St. Louis. By S. Bent Russell. Illustrated, 1 2-3 pp., Engineering News, Dec. 23. 15 cts.

Records and Costs of Operating Filter Plant. Philadelphia Water Supply. 2-3 p., Engineering-Contracting, Nov. 24. 10 cts.

Ludlow Filters. Account of construction and operation. By Carroll F. Story. 15 pp., Journal New England Water Works Association. September. $1.00

New Filtration Plant for Wilkinsburg, Pa. Paper before Central States Water Works Association. By F. B. Leopold. 1 1-3 pp., Water and Gas Review, November. 20 cts.

Sterilization of Water and of Sewage Effluents, Practical. Paper before Institution of Municipal Engineers. By H. C. H. Shenton, 4½ pp., Water, Nov. 13; 4½ pp., Dec. 15. 20 cts.

Sterilization by Ozone. Discussion at the International Congress of Applied Chemistry. 2 pp., Water, Nov. 13. 20 cts.

Purification of Water by Ozone. Successful installation at Chagres. By M. L. Borne. 1 p., Indian Public Health, November. 25 cts.

Is Purification of Water by Sterilization a Dream? 1 p., Canadian Engineer, Dec. 3. 15 cts.

Disinfection as an Adjunct to Water Purification. By H. W. Clark and Stephen D. M. Gage. 17 pp., Journal New England Water Works Association. September. $1.00.

Odors and Tastes in the Water Supply of Holyoke. Paper before New England Water Works Association. By James L. Tighe. 6 pp., Water and Gas Review, December. 20 cts. Illustrated, 26 pp., Journal New England Water Works Association, September. $1.00.

Creosote Treatment for Algæ. Communication from Wm. F. Wilcox. ¼ p., Municipal Journal and Engineer, Dec. 22; ¼ p., Dec. 8. 10 cts.

Softened Water. Is it desirable as a municipal supply? Paper before Central States Water Works Association. Experience at McKeesport, Pa. By A. G. Sandblad. 1 2-3 pp., Water and Gas Review, November. 20 cts.

Disease, Relation of Water to. By Dr. I. Davenport Jones. 1½ pp., Water, Dec. 15. 20 cts.

STREET LIGHTING AND ELECTRIC POWER

Street Lighting at Norfolk. By R. E. Scott. Illustrated, 2 pp., Illuminating Engineer, December. 20 cts.

Street Illumination. From paper before Engineers' Society of Milwaukee. By J. R. Cravath. ¾ p., Electrical World, Dec. 2. 10 cts.

"The Best Lighted City." ¼ p., Municipal Journal and Engineer, Dec. 29. 10 cts.

Special Street Illumination. As installed in St. Louis, Columbia, S. C.; Columbus, O.; Norfolk, Va. Illustrated, 3 pp., Municipal Journal and Engineer, Dec. 8. 10 cts.

An Exemplary Boulevard Illumination. Lincoln Park Boulevard, Chicago. Illustrated, 2 pp., Electrical Review, Dec. 25. 10 cts.

Standards Abroad, Street Lighting. Illustrated, 1 p., American Gas Light Journal, Nov. 22. 10 cts.

Lamp for a Street Arc, Tungsten. Use of 250-watt lamps. ¾ p., Electrical Review, Nov. 20. 10 cts.

Public Lighting Fixtures for Arc Lamps. By Gilbert Mulock. Illustrated, 1 1-3 pp., Electrical Review, Nov. 27. 10 cts.

Lighting Plant, Improving a Small Municipal. Comment on Experience at Marblehead, Mass. ½ p., Engineering Record, Dec. 11. 10 cts.

Concrete Chimney for Lighting Plant at Muncie, Ind. Illustrated. ½ p., Municipal Journal and Engineer, Dec. 15. 10 cts.

Electrolysis, Protection of Underground Pipes from. Paper before American Gas Institute. By Albert F. Ganz. 5 pp., Progressive Age, Dec. 15. 20 cts.

Report of Committee on Electrolysis to the American Gas Institute. 4 pp., American Gas Light Journal, Dec. 13. 10 cts.

Underground Conduits, Construction of. ½ p., Fire and Water, Nov. 17. 10 cts.

Underground Electric Construction. Paper before Pacific Coast Gas Association. By S. J. Lisberger. 1½ pp., American Gas Light Journal, Dec. 20. 10 cts.

Should not all Electric Wires be Placed in Conduits Under Ground. Paper before Massachusetts State Firemen's Association. By Wm. Brophy. 2 pp., Telegraph Age, Dec. 16. 10 cts. 1 2-3 pp., Fire and Water, Nov. 17. 10 cts.

Power for Various Industries, Cost of. By Chas. T. Main and F. M. Gundy. From paper before Boston Society of Civil Engineers. 1 p., Engineering Record, Dec. 25. 10 cts. 1¼ pp., Canadian Engineer, Dec. 29. 15 cts.

Engineering Aspects of Large Power Contracts. By H. S. Knowlton. 11 pp., Engineering Magazine, December. 25 cts.

Position of Electricity Supply. General Discussion. 1 p., Contract Journal, Dec. 8. 20 cts.

Gas Undertakings. Analysis of the Board of Trade Returns for 1908-'09. 1 p., Municipal Journal, Dec. 17. 15 cts.

Municipal Gas Plant Experiences. Paper before California Gas Association. By C. E. Moore. 1 p., Water and Gas Review, November. 20 cts.

Gas Supply Industry. From the Inaugural Address of the Manchester Association of Students. By J. G. Newbigging. 1½ pp., Municipal Journal, Nov. 26. 15 cts.

Technical and Mechanical Progress in the Gas Industry for the past twelve months. Report to American Gas Institute. 4½ pp., American Gas Light Journal, Dec. 27. 10 cts.

Pipe Manufacture, Development in. From American Gas Light Journal. By G. W. Whyte. Illustrated, 6 pp., Engineering Digest, December. 20 cts.

FIRE AND POLICE

Fire Department, New York City. General account. 1 2-3 pp., Fire and Water, Nov. 17. 10 cts.

Politics and the Louisville Fire Department. 1 p., Fireman's Herald, Nov. 20. 5 cts.

Kansas City Fire Department. Illustrated, 1½ pp., Fire and Water, Nov. 24. 10 cts.

Compensation of Firemen. Tabular Statement of Annual Salaries paid in some cities. 2 pp., Fire and Water, Nov. 24. 10 cts.

Fire Fighting, Demolition in. Paper before Massachusetts State Firemen's Association. By Thos. W. Roose. 2-3 p., Fire and Water, Nov. 17. 10 cts.

Nozzles. Influence of Shape and Size. From the Fireman, London. 2-3 p., Fire and Water, Dec. 15. 10 cts.

Extinguishers, Liquid Versus Dry Powder Chemical. By J. B. Barrett. 1½ pp., Fireman's Herald, Dec. 25. 5 cts.

Service at Buffalo, Fire and Water. 2 pp., Fire and Water, Nov. 24. 10 cts.

Protection System, High-Pressure Fire. Winnipeg, Canada. 2-3 p., Engineering Record, Nov. 27. 10 cts.

Insurance Rates, Making of. The rate problem considered at the fire prevention end. 2 pp., Insurance Engineering, November. 25 cts.

Police Promotion. Extracts from address before National Municipal League. By Arthur H. Woods. ¾ p., Good Government, December. 10 cts.

Criminals, Classification of, and Preventive Detention. By W. P. Archibald, Dominion Parole Officer. 3 pp., Canadian Municipal Journal, December. 10 cts.

GOVERNMENT AND FINANCE

Legislation in Iowa, Proposed Municipal. Report to the League of Iowa Municipalities. By C. F. Kimball. 11 pp., Midland Municipalities, December. 10 cts.

Government by Commission. Ontario Railway and Municipal Board. By J. E. Parsons. 1½ pp., Canadian Engineer, Nov. 26. 15 cts.

Proportional Representation. A new election system. By Earl Gray. 1½ pp., Municipal World, December. 10 cts.

Staunton's General Manager. Virginia city run as a business proposition. Results after two years' trial. Concentrated authority and responsibility. Preferred to commission plan. By John Crosby, President of Common Council. 1½ pp., Municipal Journal and Engineer, Dec. 29. 10 cts.

Municipal Ownership of Public Utilities. By R. R. Jamison. 2 pp., Western Municipal News, December. 10 cts.

Municipal Trading Relieves Rates. Tabular statement 1909-10. 2 pp., Municipal Journal, Dec. 10. 15 cts.

Dangers Lurking in the Unlimited Control of Corporations by Governmental Commissions. By Woodrow Wilson, ½ p., Public Science, December.

Regulation Should Protect Utilities. From address before American Street Interurban Railway Association. By James F. Shaw. 1 p., Public Service, December. 20 cts.

Some Features of State Regulation of Public Utilities. Address before Wisconsin State Bar Association. By John H. Roemer. 4 pp., Water and Gas Review, November, 20 cts. 3 pp., Progressive Age, Dec. 1. 20 cts. 2 pp., Electric Railway Journal, Nov. 27. 10 cts. 1½ pp., Water and Gas Review, December. 20 cts

Rates for Public Service, Equitable. By Dugald C. Jackson. 4 pp., Public Service, December. 20 cts.

Depreciation as an Element in Rate Making. Decision of the Railroad Commission of Wisconsin regarding telephone rates. 1 p., Electrical World, Dec. 2. 10 cts.

Appraisal of Public Utility Properties, Going Value as an Element in the. By Wm. H. Bryan. 12 pp., Journal of the Association of Engineering Societies, October. 30 cts.

What is the Right Unit and Basis of Real Estate Valuation. Answers to communications from American Cities. 1 2-3 pp., Real Estate News, December. 25 cts.

Bond Sales, Municipal, during November. 1 p., Municipal Journal and Engineer, Dec. 15. 10 cts.

Accounting, Correct, as a Fundamental Basis for Regulation and Taxation. Paper before American Association of Public Accountants. By Allen R. Foote. 12 pp., Journal of Accountancy, November. 25 cts.

Economy in Municipal Management. ¼ p., Municipal Journal and Engineer, Dec. 15. 10 cts.

Depreciation, Renewal and Replacement Accounts. Paper before American Association of Public Accountants. By H. G. Stockwell. 14 pp., Journal of Accountancy, December. 25 cts.

Purchasing Department, Municipal. Account of the organization in Cleveland, O. Figures showing saving effected. By A. R. Callow, chief of the department. 2½ pp., Municipal Journal and Engineer, Dec. 22. 10 cts.

Exchange of Municipal By-Products. Recommendations to the Board of Park Commissioners, Hartford, Conn. By Geo. A. Parker. What Park Department can give and what it needs. 1 p., Municipal Journal and Engineer, Dec. 15. 10 cts.

TRAFFIC AND RAPID TRANSIT

Rapid Transit Policy for Greater New York. From paper before National Municipal League. By Milo R. Maltby. 1 p., Electric Railway Journal, Dec. 4. 10 cts.

London Rapid Transit Facilities. 1½ pp., Electric Railway Journal, Dec. 4. 10 cts.

Elevated Electric Railway, London's First. By W. B. Paley. 2-3 p., Engineering Record, Dec. 25. 10 cts.

Details of Concrete Encasement for Elevated Railway Structure and of special forms employed in its construction. Illustrated, 2 pp., Engineering-Contracting, Dec. 17. 15 cts.

Subway, City of London. Unique Difficulties at Blackfriars. 1 p., Surveyor, Dec. 3. 20 cts.

The Blackfriars Subways. ½ p., Contract Journal, Dec. 1. 20 cts.

Comparison of Operation of the New York and Paris Subway. By R. L. Whitten. Illustrated, 7 pp., Electric Railway Journal, Dec. 11. 10 cts.

Trolley Improvements at Ilford, Electric and. Illustrated, 2 pp., Municipal Journal, Dec. 3. 15 cts.

Rail for Street Railway Tracks, Question of the Proper Form of. Difference of opinion between city engineers and street railway men. 2-3 p., Engineering-Contracting, Dec. 1. 10 cts.

Advantages of Tee Rails for Street Railways. Paper before American Society of Municipal Improvements. By D. H. Hegarty. Illustrated, 1 p., Engineering-Contracting, Nov. 24. 10 cts.

Monorail, Motor Cars and the Possible Revolution in Traction. 1½ pp., Public Service, December. 20 cts.

Electrolysis, Erroneous Electric Railway Theory. 3½ pp., Water and Gas Review, December. 20 cts.

Motor Car, Gas Electric. Self-Contained Type. By A. W. Jones. Illustrated, 4 pp., General Electric Review, January. 20 cts.

Car Ventilation, Two Recent Developments in. Illustrated, 1 p., Engineering News, Dec. 23. 15 cts.

Valuation Basis for Railways. From petition to Massachusetts Board of Railroad Commissioners. By A. A. Ballantine. 1 p., Public Service, December. 20 cts.

STREET CLEANING AND REFUSE DISPOSAL

Street Cleaning Conditions in Boston, a Study of. With data on the cost of snow removal, push-cart patrol system, machine-sweeping and maintenance of horses. From report to Finance Commission, Boston, by S. Whinery. 4 pp., Engineering-Contracting, Dec. 22. 10 cts.

Street Flushing in New York. Tests of machines and official data as to cost, including water used. Plans prepared for letting large contract. Illustrated, 2 pp., Municipal Journal and Engineer, Dec. 29. 10 cts.

Rubbish and Snow Removal. Methods employed in New York City. Abstract of popular lecture delivered by Commissioner Edwards with a view to securing co-operation of the public in keeping the streets clean. General account of operating, including snow removal. Illustrated, 5 pp., Municipal Journal and Engineer, Dec. 22. 10 cts.

Collection and Disposal of House Refuse. Paper before Royal Sanitary Institute. By John S. Brody. 2 pp., Surveyor, Dec. 10. 20 cts.

A Difficult Municipal Problem. Removal of waste. ¼ p., Municipal Journal and Engineer, Dec. 29. 10 cts.

Dust and Dust Bins. Removal of municipal waste., 2-3 p., Contract Journal, Dec. 15. 20 cts.

New Garbage Cart. A type in use in Boston. Removal of cans with covers which close automatically. Minimum nuisance from flies and odors. Thorough cleaning possible. Illustrated, ¾ p., Municipal Journal and Engineer, Dec. 29. 10 cts.

Refuse Disposal, and the New Refuse Incineration Plant for Milwaukee. By S. A. Greeley. Paper before Engineers' Society of Milwaukee. Illustrated, 14 pp., Journal of the Association of Engineering Societies, November. 30 cts.

Electricity from Refuse. The Prahran, Melbourne, Destructor Plant. 1½ pp., Surveyor, Nov. 19. 20 cts.

Waste Disposal. How to derive a revenue from tin cans. ¼ p. Municipal Journal and Engineer, Dec. 8. 10 cts.

Incinerator Plant at Cambridge, Mass. Construction and cost of operation. 1-3 p., Municipal Journal and Engineer, Dec. 29. 10 cts.

BRIDGES AND STRUCTURAL MATERIALS

Bridge, First Street, Brandon, Manitoba. By R. E. Speakman. Illustrated, 2½ pp., Canadian Engineer, Dec. 10. 15 cts.

Design of the Broadway or Sparkman Street Bridge, Nashville, Tenn. By Howard M. Jones. Illustrated, 7 pp., Engineering News, Nov. 25. 15 cts.

Erection of the Webster-Donora Bridge near Clairton, Pa. Illustrated, 2 pp., Engineering Record, Nov. 27. 10 cts.

Inspection Disclosures. Bridge. Account of inspections of two thousand bridges. By H. C. Keith. 2 pp., Engineering Record, Dec. 11. 10 cts.

Replacing the Superstructure of a Harlem Ship Canal Bridge. By Horace J. Howe. 21 pp., Proceedings of the American Society of Civil Engineers, November. 50 cts.

Concrete Bridge of Novel Design at Nashville, Tenn. Illustrated, 1 p., Concrete, December. 15 cts.

A Flat Slab Reinforced Concrete Street Railway Bridge, St. Paul, Minn. Illustrated, 1 p., Engineering News, Dec. 23. 15 cts.

Materials, Selection of. Consideration of costs and quality. 1-3 p., Municipal Journal and Engineer, Dec. 22. 10 cts.

Cement and Sand for concrete. Discussion before Boston Society of Civil Engineers. 29 pp., Journal of the Association of Engineering Societies, November. 30 cts.

Cost of Making Cement in England. From paper before Junior Institution of Engineers. By Harry Horsburgh. ½ p., Engineering Record, Dec. 25. 10 cts.

Austrian Tests of Cement Mortars in Seawater and Salts. ½ p., Engineering News, Dec. 9. 15 cts.

Recording Photographically the Setting of Cement. By H. Burchartz. Illustrated, 1½ pp., Engineering Record, Dec. 11. 10 cts.

Revised German Standard Specifications for Portland Cement. ½ p., Engineering News, Dec. 2. 15 cts.

A Comparison of Reports on Tests of the Same Cement by Various Laboratories. By Alexis Saurbrey. 1 1-3 pp., Engineering News, Dec. 9. 15 cts.

Lack of Uniformity in Results of Cement Tests. Communication from L. A. Waterbury. 1-3 p., Engineering News, Dec. 30. 15 cts.

Determination of Silica in Portland Cement. 1 p., Cement, November. 25 cts.

A Plain Account of the Characteristics Required of Cement, Sand and Stone for Concrete. 2 pp., Engineering-Contracting, Dec. 1. 10 cts.

Progress in the Methods of Testing Hydraulic Cements. Paper before International Association for Testing Materials. 6 pp., Cement Age, December. 15 cts.

Concrete not Universally Applicable. Precautions necessary. ½ p., Municipal Journal and Engineer, Dec. 1. 10 cts.

Design and Construction of Forms for Concrete Work. Illustrated, 2½ pp., Engineering-Contracting, Nov. 24. 10 cts.

Experiments in Coloring Concrete. By Chas. E. Pellew. 3 pp., Cement, November. 20 cts.

Making Concrete Water Proof. By Ira A. Baker. 1½ pp., Contractor, Dec. 15. 20 cts.

Effect of Alkali on Concrete. Paper before American Society of Civil Engineers. By George Gray Anderson. 14 pp., Proceedings of the American Society of Civil Engineers, December. 50 cts.

Some Notes on Concrete Materials and Proportions. 1 p., Engineering-Contracting, Dec. 17. 15 cts.

Design and Construction of Form for Concrete Work. 1 p., Engineering-Contracting, Dec. 1. 10 cts.

Concrete Mixers. General description of continuous batch and gravity types. Shapes of drums. Measure and loading devices. Illustrated, 1½ pp., Municipal Journal and Engineer, Dec. 1. 10 cts.

Concrete Mixing Machinery. Review of progress in recent years. ½ p., Municipal Journal and Engineer, Dec. 1. 10 cts.

Reinforced Concrete. Paper before Liverpool Architectural Society. By F. E. G. Badger. 2 pp., Surveyor, Dec. 10. 20 cts.

An Experimental Study of Reinforced Concrete in Compression. 6½ pp., Cement, November. 20 cts.

Ferro-Concrete Construction in Water Works. By Harry W. Taylor. 3 pp., Water, Dec. 15. 20 cts.

Timber and Concrete Piling, Comparison of, on a basis of Cost. Paper before National Cement Users' Association. By E. W. Gaylor. 1 p., Engineering-Contracting, Dec. 8. 10 cts.

Piles and Pile Driving. By F. W. Swain. From Harvard Engineering Journal. 10 pp., Engineering Digest, December. 20 cts.

MISCELLANEOUS

Town Planning. Paper before Society of Architects. By Raymond Unwin. 1 p., Surveyor, Dec. 10. 20 cts.

Town-Planning Conference. Representative opinions. ½ p., Local Government Journal, Dec. 11. 10 cts.

Town-Planning Systems. Paper before Surveyors' Institution. By W. R. Davage. Illustrated, 3 pp., Surveyor, Nov. 26. 20 cts.

A Study of the New Plan of Chicago. With remarks on city planning in general. By Charles W. Eliot, President Emeritus of Harvard University. Illustrated, 15 pp., Century, January. 35 cts.

Summary of the Provisions of the Housing and Town-Planning Bill. 2-3 p., Municipal Journal, Dec. 3. 15 cts.

Railway Terminals and Their Relation to City Planning. Paper before American Institute of Architects. By Frederick A. Delano. 2 1-3 pp., Engineering Record, Dec. 18. 10 cts.

Park Department for 1908. Annual Report of the New York. 41 pp., City Record, Nov. 30. 5 cts.

Play-Grounds, Commercial Value of. By Wm. E. Harmon. 3 pp., Survey, Dec. 11. 10 cts.

Reinforced Concrete Shelter House. Just completed in Sinton Playground, Cincinnati. Contains baths and conveniences. History of park development in Cincinnati. Illustrated, 1 p., Municipal Journal and Engineer, Dec. 1. 10 cts.

Baths, Toronto's Public. Detailed description of the Harrison free public bath. Illustrated, 1½ pp., Municipal Journal and Engineer, Dec. 29. 10 cts.

Wolverhampton's New Baths. Description of the buildings. Illustrated, 1½ pp., Surveyor, Nov. 26. 20 cts.

Superannuation, Municipal. Paper before Institution of Municipal Engineers. By John T. Pegge. 1 p., Surveyor, Dec. 17. 20 cts.

Workhouse, a Modern Institution at St. Pancras, illustrating the principle of classification. Illustrated, 2 pp., Municipal Journal, Nov. 12. 15 cts.

Municipal Art in Spokane, Wash. By G. W. James. Illustrated, 10 pp., Twentieth Century Magazine, December. 25 cts.

Gardens of New Orleans, Midwinter. An object lesson and its argument. By Geo. W. Cable. Illustrated, 12 pp., Scribners, January.

Cities. A visit to Municipal Vienna. Illustrated, 4 pp., Surveyor, Nov. 12. 20 cts.

Impressions of Budapest. By Schuyler M. Meyer. Illustrated, 18 pp., Architectural Record, December. 25 cts.

The Pioneers of Mound Bayou. Story of a negro colony in Mississippi. By Hiram Tong. Illustrated, 10 pp., Century, January. 35 cts.

Growth of Metropolitan Suburban District. 3 pp., Surveyor, Dec. 3. 20 cts.

Flood Protection, Problem of. Projects in several American Cities. 1 p., Engineering News, Dec. 9. 15 cts.

Flood Prevention and Land Fertilization by Basin Irrigation in the Sacramento-San Joaquin Valley. Illustrated, 1½ pp., Engineering News, Dec. 9. 15 cts.

Pier, Reinforced Concrete Municipal, San Monica, Cal. By Edwin Hall Warner. Illustrated, 1½ pp., Engineering News, Dec. 9. 15 cts.

Ferry Houses, Municipal. General description of city buildings in New York. By Walker and Morris. Illustrated, 7 pp., Architects' and Builders' Magazine, November. 20 cts.

Competition Wanted, No Outside. View of Comptroller from an Illinois City. ¼ p., Municipal Journal and Engineer, Dec. 15. 10 cts.

Municipal Reform. The Beast and the Jungle. Third installment. By Judge Ben B. Lindsey. Illustrated, 12 pp., Everybody's, January. 15 cts.

Noise and Dust Ordinances. 1-3 p., Municipal Journal and Engineer, Dec. 29. 10 cts.

Purchase of Coal by the B. T. U. Method. Paper before American Mining Congress. By Samuel A. Taylor. 4 pp., Canadian Engineer, Dec. 17. 15 cts.

Conveying Concrete Through Pipes Under Air Pressure, Experiments On. By J. W. Buzzell. Illustrated, 1 p., Engineering News, Nov. 25. 15 cts.

Pumping of Cement Grout into Masonry on the Metropolitan Railway, Paris. Illustrated, 1 p., Engineering News, Nov. 25. 15 cts.

Cement Unloading Plant. Capacity 6,000 packages an hour. Adjustable to varying depths of ships. Installation at Panama Canal Wharves. Illustrated, 1 p., Municipal Journal and Engineer, Dec. 1. 10 cts.

Moving Earth with Elevating Graders and Dump Wagons. Experience at Stanley Lake Dam, near Denver, Col. 1 p., Engineering Record, Dec. 11. 10 cts.

Cost of Hauling with Traction Engine and Dump Wagons as compared with hauling with horses. Illustrated, 4½ pp., Engineering-Contracting, Dec. 8. 10 cts.

Diagram for Calculating Overhaul by the Aid of Profile Paper and Diagrams. 1 p., Canadian Engineer, Dec. 3. 15 cts.

Hoisting Engines, Simple Types of Small. By Warren O. Rogers. Illustrated, 3½ pp., Power, Dec. 21. 5 cts.

Stone Crusher, Test Run of a Municipal. From report of Metcalf and Eddy regarding operations of the Street Department of Boston. ½ p., Engineering Record, Dec. 18. 10 cts.

Boiler Plant of New York City, Preventable Losses by the Municipal. 1½ pp., Engineering News, Dec. 23. 15 cts.

Earth Pressure on Retaining Walls, Tables for the Determination of. By C. K. Moehler. 1½ pp., Engineering News, Nov. 25. 15 cts.

Tunnel, Siphon, under the River Dee, Scotland. From paper before Institution of Civil Engineers. By Geo. R. G. Conway. Illustrated, 2 pp., Engineering Record, Dec. 4. 10 cts.

Reconstruction of the Washington Bridge Tunnel, Chicago. Illustrated, 1 p., Engineering Record, Dec. 11. 10 cts.

Management Engineering, Science of. Paper before American Society of Engineering Contractors. By H. P. Gillette. 2 pp., Contractor, Dec. 15. 20 cts. 2 pp., Engineering-Contracting, Dec. 17. 10 cts.

Files and Indexes, Requirements of Engineering. From paper before Boston Society of Engineers. By Herman K. Higgins, 2 pp., Engineering News, Dec. 30. 15 cts.

Profession of Engineering. From Presidential address before American Society of Mechanical Engineers. By J. M. Smith. 1 p., Engineering Record, Dec. 11. 10 cts.

Two New Codes of Professional Ethics. Those of the Philadelphia Chapter, American Institute of Architects, and the Alberta, Canada, Association of Architects. 2-3 p., Engineering Record, Dec. 18. 10 cts.

Laboratories, European Engineering. Paper before Engineers' Club, Toronto. By R. W. Angus. Illustrated, 5½ pp., Canadian Engineer, Nov. 26. 15 cts.

Cost Data, Use and Abuse of. 2-3 p., Engineering News, Dec. 23. 15 cts.

Contracts and Specifications in New York, Suggestions for the Standardization of. Extracts submitted by the General Contractors' Association of New York to a committee of engineers appointed by the Board of Estimate. 1 p., Engineering News, Dec. 30. 15 cts.

Resilient Wheels for Vehicles, Improvements in. From paper before Royal Society of Arts. By R. C. Parsons. 1 p., Contract Journal, Dec. 8. 20 cts.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Street Railways—Sanitation, Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we can not guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also corrections of any errors discovered

BIDS ASKED FOR

State	City	Received Until	Nature of Work	Address Inquiries to
			STREET IMPROVEMENTS	
Ohio	Dunlap	Jan. 7	Improving stone Mill Road, Specifications 986	Fred Dreihs, Clk. Co. Com'n.
Illinois	East St. Louis	Jan. 8, noon	Brick paving, 9,095 sq. yds.; curbing, 5,095 lin. ft.; draining, etc., 25th street	W. J. Crocken, City Engineer.
Kansas	Ft. Leavenworth.	Jan. 8, 11 a.m.	Grading 84,000 cu. yds. of earth	Capt. William D. Davis, Q. M.
Oklahoma	Elk City	Jan. 10, 8 p.m.	Vit. block paving, 20 blocks; grading, sewers, curb, etc.	H. O. Hixon, Mayor.
New Jersey	Jersey City	Jan. 10, 2 p.m.	Brick paving, 715 sq. yds. on 6-in. concrete, curb, flagging, etc.	Geo. T. Bouton, Clk. St. & Wtr. Bd.
New York	New Brighton	Jan. 11, noon	Regulating and repaving with bitulithic or asphalt block on present macadam, Fingerboard road	Geo. Cromwell, Boro. Richmond.
Maryland	Baltimore	Jan. 12, 11 a.m.	Furn. vit. paving block, cement, sand, etc., new pier No. 6	O. F. Lackey, Harbor Engr.
Oklahoma	Dustin	Jan. 17, 3 p.m.	Laying concrete cement sidewalks, 4, 5, 8 and 12 ft. wide	F. P. Hicks, Town Clerk.
Mississippi	Vicksburg	Jan. 17	Paving four blocks, any material; sewer, water mains, etc.	J. J. Hayes, Mayor.
Alabama	Birmingham	Jan. 19, 11 a.m.	Vit. brick paving, asphalt, bitulithic or granitoid	Maury Nicholson, City Engineer.
Alabama	Gordon	March 15	Constructing 51 miles of graded road in Houston County	W. J. Parish, County Com'r.
			SEWERAGE	
Wisconsin	Milwaukee	Jan. 7	Constructing concrete relief sewer in Brown st.	C. J. Poetsch, Chm. Bd. Pub. Wks.
New Jersey	Jersey City	Jan. 10, 2 p.m.	Bldg. 440 ft. 18-in. sewer, 100 cu. yds. rock excav., etc.	Geo. T. Bouton, Clk. St. & Wtr. Bd.
Oklahoma	Oklahoma City	Jan. 10	Bldg. lateral sewers in portions of 4 subdivisions	Bob Parman, City Clerk.
Oklahoma	Sapulpa	Jan. 10	Furn. material and bldg. brick trunk sewer: 12,920 ft. 42 to 84-in. brick sewers, 11 manholes, 9 inlets, 300 ft. 24-in. vit. pipe, 52 cu. yds. concrete	E. D. Kirkpatrick, City Engr.
South Carolina	Charleston	Jan. 11, noon	Contract A: 3 miles 8 to 18-in. pipe sewers; Cont. B: 8 1-2 miles same, with house connections, etc.; other sections later; entire cost, $300,000	J. R. Johnson, Pres. Bd. Pub. Wks.
New York	Buffalo	Jan. 11	Bldg. 3 sewers, 20 to 10-in. tile	F. G. Ward, Comr. Pub. Wks.
Florida	Quincy	Jan. 12	Constructing sewer system, mainly 7.5 miles 8, 12, 15 and 18-in. pipe, 4 to 25 ft. deep; 20 flush tanks, 70 manholes and one septic tank; Geo. H. Palmer, C.E.	S. T. Williamson, Chm. B. P. W.
Kansas	Holton	Jan. 12, noon	Bldg. sewer system and disposal plant, inc. 45,000 ft. 8-in. sewer, 64 manholes, 35 flush tanks, 14,000 ft. 10, 12 and 15-in. sewer, 41 manholes and disposal plant; Wm. C. Bryant, Engr.	S. H. Newell, City Clerk.
Nebraska	Hebron	Jan. 12, 2 p.m.	Bldg. 13,000 ft. 8-in. vit. pipe, 12 flush tanks, 25 manholes; also main and outlet sewers; 1,300 ft. 15-in. and 1,760 ft. 10-in. vit. clay pipe, etc.; C. H. Meeker, McCook, Engr.	O. P. Hess, City Clerk.
Iowa	Traer	Jan. 13	Constructing system of sanitary sewers	F. F. Stokes, City Clerk.
Colorado	Denver	Jan. 14, 11 a.m.	Bldg. Dist. Sewers, sub mains, etc., for West and South Side Sanitary Sewer Dist.; cost, $600,000	W. B. Lowry, Pres. Bd. Pub. Wks.
Illinois	Collinsville	Jan. 15, 7 p.m.	Improving Sanitary Sewer Dist. No. 2: 10,727 ft. 8-in., 4,017 ft. 10-in., 1,379 ft. 12-in. vit. sewers; 120 ft. 12-in. c. i. pipe, 36 brick manholes, 16 flush tanks, 10 vit. pipe lamp holes, 210 cu. yds. cement, septic tank	J. E. Simpson, Chm. Bd. Loc. Impts.
Mississippi	Vicksburg	Jan. 17	Storm sewer, water mains, paving, etc., four blocks	C. R. Twiss, City Engineer.
Alabama	Montgomery	Jan. 17	Bldg. 5,000 ft. 12-in. sanitary sewer to South outfall	Robert Tait, City Treasurer.
New York	North Pelham	Jan. 18, 8 p.m.	Bldg. sewer system: 9,160 ft. 15-in., 1,183 ft. 12-in., 1,735 ft. 10-in., 28,811 ft. 8-in. vit. pipe; 1,500 cu. yds. rock excav.	Harold B. Roberts, Village Engr.
British Col'bia	Prince Rupert	Jan. 19	Installation of sewerage works	Minister of Public Works.
California	East San Jose	Jan. 25	Bldg. sewer system, including septic tank	J. E. Fisher, Town Engineer.
Oklahoma	Ardmore	Feb. 1, noon	Bldg. 2 sewage disposal plants of 600,000 gals. per 24 hours capacity; bidders furnish plans, etc.	G. H. Bruce, City Clerk.
Ontario	Toronto	Feb. 15, noon	Sewer outlet, sewage tanks, supply of sludge valves, penstocks, special tile, c. i. pipe, etc.; bids by registered post only	Jos. Oliver, Chm. Bd. Control.
Oklahoma	Lawton	Feb. 16	Bldg. sanitary sewer system for North Additions	Asst. Sec'y Dept. Int., Wash., D. C.
			WATER SUPPLY	
Washington	Tacoma	Jan. 10, 11 a.m.	Furn. 3 horizontal tubular boilers, 66 x 16 in., f.o.b. Tacoma	H. J. McGregor, Com'r Pub. Wks.
Virginia	Petersburg	Jan. 10	Complete installation of pumping plant, 1,800 gals. per min.; producer gas or elec.-driven pumps	R. D. Budd, City Engineer.
Oklahoma	Broken Arrow	Jan. 10	Constructing water works, to cost $37,000	C. A. Fox.
Nebraska	Carroll	Jan. 11	Constructing water works; previous bids rejected	City Clerk.
New York	New York	Jan. 11, 11 a.m.	Contract No. 52: portions of White Plains division Catskill Aqueduct, inc. 3 tunnels in hydraulic gradient, 1.6 miles long, one 17 x 13 1-3 ft. and two 17 1-2 x 13 3-4 ft.; 2.8 miles plain concrete condiut, 17 1-2 x 18 ft., in Mt. Pleasant and Greenburgh, Westchester County	Board of Water Supply.
Kansas	Cawker City	Jan. 11	Furn. material and installing water works; separate bids as follows: furn. and lay 7,050 ft. 6-in., 14,580 ft. 4-in. c. i. pipe; 2,250 ft. 2-in. galv. iron pipe, 28 hydrants, etc.; furn. and erect 75,000-gal. tank on 125-ft. tower, inc. foundation; triplex pump and power head, etc.; G. P. Taylor, C.E., Stockton	G. B. McKinley, City Clerk.
New York	New Brighton	Jan. 12	Furn. and laying water mains and removing existing mains, etc.	H. S. ThompsonComr. W. S. G. &. E.
North Carolina	Wilmington	Jan. 12, noon	Bldg. brick power and filter house, machinery foundations, rearranging machinery, bldg. radial brick stack, concrete storage reservoir, reinforced concrete sedimentation basin, extensions to filter plant, etc	Hazlehurst & Anderson, Engrs.
Nebraska	Hebron	Jan. 12, 2 p.m.	Extension of city water system; C. H. Meeker, C.E., McCook.	O. P. Hess, City Clerk.
British Col'bia	Victoria	Jan. 12	Furn. 10 miles 12, 8 and 6-in. steel and iron pipe; also 250 tons 4-in. c. i. pipe for 1910	W. A. Clement, City Engr.
Colorado	Lamar	Jan. 15	Bldg. rein. concrete head gate, etc., for Reservoir No. 4	Chivington Canal Co.
Ontario	Stratford	Jan. 15	Two elec.-driven turbine pumps, 1,000,000 and 1,500,000 gals.	T. D. Barnett, Chm. Water Bd.
Mississippi	Macon	Jan. 17, 7 p.m.	Pumps, ejector, condenser and check valve, valves, fittings, etc., for light and water plant; cost, $20,000	G. B. Baskerville, Jr., C. E.
Mississippi	Vicksburg	Jan. 17	Laying water mains, storm sewer, paving, etc., 4 streets	C. R. Twiss, City Engineer.
New York	New York	Jan. 18, 11 a.m.	Contract 68: bldg. 7 steel pipe siphons, riveted steel, 9 1-4 and 11 1-4 ft. nominal inside diameter, 2.6 miles long; also 250 ft. cut-and-cover aqueduct; Contract 41: furn. and install twenty 5x15 ft. sluice gates, 20 operating mechanisms, eight 66-in. stop disk frames, four 66-in. stop disks and 3 sets of drive shafting along aqueduct	Board of Water Supply.
Mississippi	Jackson	Jan. 22, 3 p.m.	Boring artesian wells and furnishing machinery for pumping 4,000,000 gals. per 24 hours	H. Johnson, Gen. Mgr., Wtr. Comm.
Oklahoma	Ardmore	Feb. 1, noon	Bldg. sedimentation basins and filtration plant, and extension of water main at city lake	G. H. Bruce, City Clerk.
Texas	Midland	Feb. 15	Constructing water works; O'Neil Eng. Co., Dallas.	J. H. Haley, Mayor.
Ontario	Toronto	Feb. 15, noon	Furn. c. i. pipe, iron castings, special tile, etc.	Jos. Oliver, Chm. Bd. Control.

BIDS ASKED FOR

STATE	CITY	RECEIVED UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
			BRIDGES	
Ohio	Cincinnati	Jan. 7, noon	Repairing east abutment of bridge over Little Miami river	Stanley Struble, Pres. Bd. Co. Comrs
Arkansas	Murfreesboro	Jan. 11	Bldg. single span steel bridge, 200 ft. long; cost, $8,000	S. J. Thomasson, C.E., Co. Comrs.
Nebraska	Nebraska City	Jan. 11, noon	Constructing a bridge; $500 check	S. P. Young, County Clerk.
Nebraska	Geneva	Jan. 11, noon	Furn. and erect all County bridges during 1910	Uriah F. Stanard, County Clerk.
Nebraska	York	Jan. 11, noon	Bldg. steel and wooden bridges ordered by County in 1910	W. A. Miller, County Clerk.
Nebraska	Grand Island	Jan. 12, noon	Bldg. and repairing all steel and wood bridges, etc., for one year	G. H. Poell, County Clerk.
Oregon	Portland	Jan. 14, 4 p.m.	Furn. material and bldg. steel viaduct for city over Sullivan's Gulch, E. 12th st.: six 32-ft. and two 64-ft. deck plate girder spans on steel bents, concrete pedestals and abuts.; 40-ft. roadway; two 10-ft. walks	Waddell & Harrington, Cons. Engrs., New Nelson Bldg., Kan. City, Mo.
Ohio	Cincinnati	Jan. 14, noon	Bldg. bridge over Bloody Run, at Beach st., Mill creek twp.	Stanley Struble, Chm. Co. Comrs.
Texas	Dallas	Jan. 15	Furn. and erect. steel hwy. bridge and viaduct over Trinity river, 5 miles south; span over river 200 ft., with 2,520 ft. of plate girder span of 60 ft. each and one mile of gravel road; J. F. Witt, County Engineer	George L. Fearn, County Auditor.
Arizona	Florence	Jan. 15	Bldg. rein. concrete highway bridge, 700 ft. long, over Gila river.	J. B. Giraud, Tery. Engr., Phoenix.
Indiana	Indianapolis	Jan. 15	Bldg. stone and concrete bridge over Pogue's run, Commerce avenue	B. H. Miller, City Engineer.
Washington	Tacoma	Jan. 17, 11 a.m.	Bldg. $90,000 steel and rein. concrete bridge; removing old one.	H. J. McGregor, Com'r Pub. Wks.
Ohio	West Union	Jan. 17, noon	Superstructure of steel bridge with cement floor	E. C. Zimmerman, Co. Surveyor.
Manitoba	Winnipeg	Jan. 18, 11 a.m.	Removing present superstructure and furn. and erect new one and floor complete for Louise bridge over Red river	M. Peterson, Sec'y Bd. Control.
Oklahoma	Wagoner	Jan. 18, 10 a.m.	Bldg. 340-ft. steel bridge on tubular foundations	J. E. Hildt, County Clk.
Texas	San Antonio	Jan. 20	Bldg. rein. concrete arch bridge over Medina river at Pleasanton road: two 100-ft. and two 30-ft. spans with 18-ft. roadway; 850 cu. yds. rein. concrete; 1600 cu. yds. rubble concrete; estimated cost, $22,000	Board of County Comrs.
Florida	Jacksonville	Jan. 21	Bldg. 3 bridges: Over Six-Mile Creek, 241 ft. over all, 16ft. wide, 43-ft. draw, rein. concrete approaches, 60 and 75 ft. long; Little Portsburg Creek rein. concrete bridge, 165 ft. long, with 6 panels, 16 ft. wide; Trout Creek bridge, 104 ft. steel span, 16-ft. roadway, with steel truss and concrete floor	G. L. Barnard, County Engineer.
Ohio	Monroeville	Jan. 24, 10:30 a.m.	Furn. and erect riveted truss bridge over river at Main st.; two spans 62 ft. each and one 80 ft. long; 20-ft. roadway with one 4-ft. sidewalk	Fay E. Smith, Co. Aud., Norwalk.
			LIGHTING AND POWER	
New York	New York	Jan. 7, 3 p.m.	Furn. and install gas and electric fixtures, Bellevue Hospital	Board of Hospital Trustees.
Texas	Houston	Jan. 11	Furn. electric fixtures for County Court House	Lang & Witchell, Archs., Dallas.
Virginia	Nat'l Sold. Home	Jan. 11, 1:30 p.m.	Remodeling electric plant; poles, wires, etc	Treas. National Soldiers' Home.
North Carolina	Wilmington	Jan. 12, noon	Power station and filter extensions; see "Water Supply"	C. W. Worth, Chm. Wtr. & Sew. Bd.
Virginia	Richmond	Jan. 14, 4 p.m.	Furn. and erecting transmission lines	E. E. Davis, Supt. Water Dept.
Washington	Spokane	Jan. 15, 2 p.m.	Three transformers with protection devices, con., etc.	Geo. W. Armstrong, Sec'y Bd. P.W.
Mississippi	Macon	Jan. 17, 7 p.m.	Furn. only compound high-speed engine, two 2,300-volt, 3-phase generators and exciters; three 2,300-volt, 3-phase vertical motors, one 3-panel switchboard and instruments, series st. lights, 3 vertical turbine pumps, feed water pump, etc., for light and water plant; cost, $20,000	Mayor and Board of Aldermen.
Maine	Ft. Williams	Jan. 20, 10 a.m.	Bldg. and remodeling electric light plant	C. F. Humphrey, Q. M.
Dist. of Col'bia	Washington	Jan. 21, 2 p.m.	Remodeling power plant at Government Hospital for Insane	J. E. Wilson, Asst. Sec'y Inter. Dep.
Illinois	Chicago	Jan. 29, 11 a.m.	Furn. and install lighting fixtures in new City Hall bldg	John J. Hanberg, Comr. Pub. Wks.
Manitoba	Winnipeg	Feb. 15, 11 a.m.	Furn. and erect. various portions of equipment for terminal station at Winnipeg, turbine governors and gate valves for gen. station, hydro-elec. development	M. Peterson, Sec'y Bd. Control.
			MISCELLANEOUS	
Florida	Bronson	Jan. 8	Enlarging and supplying County Jail with cells	A. P. Hardee, Clk. Levee. Comrs.
Indiana	Jeffersonville	Jan. 8, 10 a.m.	Furnishing 15 sanitary carts, under Circular 499	Maj. J. T. Davidson, Q. M.
Wisconsin	Kenosha	Jan. 8, 9 a.m.	Bldg. County jail, complete; Jos. Lindl, Arch., 312 Main st	Russell H. Jones, County Clerk.
New York	New York	Jan. 10, noon	Removing, rebldg., extending, etc., Pier 42, North river	Calvin Tomkins, Comr. of Docks.
Illinois	Chicago	Jan. 10, 10 a.m.	Furn. 50,000 bbls. Portland cement, f. o. b. works	U. S. Reclamation Service.
Mississippi	Greenville	Jan. 10	Levee enlargement work, 230,000 cu. yds., near Gunnison	Bd. Miss. Levee Comrs.
Connecticut	New Haven	Jan. 11, 4 p.m.	Removing garbage from city for one year from Feb. 1	Ward Bailey, Clk. Bd. of Health.
Pennsylvania	Franklin	Jan. 11, 2 p.m.	Bldg. $50,000 County jail; Charles & Bailey, Archts., Oil City	E. K. Smiley, Clk. Bd. Co. Comrs.
Maryland	Baltimore	Jan. 12, 11 a.m.	Furn. sand, gravel, cement, etc., on new pier No. 6	O. F. Lackey, Harbor Engr.
California	San Bernardino	Jan. 24	Franchise for single or double-track railroad for 49 years, of electricity, steam or compressed air, to Rialto; W. W. Poole, et al., applicants	Board of County Commissioners.
Texas	Houston	Feb. 7, noon	Erecting new City Auditorium; F. L. Dormant, Cons. Engr.	H. B. Rice, Mayor.

STREET IMPROVEMENTS

Mobile, Ala.—Chief Engineer Wright Smith has estimated cost of paving and sewerage for Broad st., Spring Hill ave. and Davis ave. at $178,965.

Glendale, Ariz.—Plans have been prepared for the construction of $100,000 worth of macadam roads in Road District No. 3. About 25 miles of road will be macadamized. Contracts will be let in early spring. —Fay McClure, Phoenix, Engineer; Ralph Murphy, Secretary, Board of Trustees.

Phœnix, Ariz.—County is considering purchase of road machinery.

Jonesboro, Ark.—Street Paving Commission, Improvement District No. 4, has rejected all bids offered, it being determined that the paving as first planned could not be done with money available. At an early date E. C. Tuck and Thomas Burrell will accompany Commission on an inspection tour of other cities, after which Commission will again advertise for bids for class of work decided on.

Kennett, Cal.—Kennett Improvement Club has decided to renew its application before Supervisors for east side wagon road from Kennett to Redding.

Pasadena, Cal.—Broadway ave. from Holly to Walnut st. is to be widened from 50 to 60 ft.

Woodland, Cal.—Mayor Mitchell is urging macadamizing of Main st.

Woodland, Cal.—City Trustees have adopted modified report by City Engineer on resolution authorizing street work on about six miles of streets; South College ave. improvement is not included.

Colorado Springs, Col.—City Engineer T. L. Waggener has estimated cost of paving proposed new district from $364,810 to $491,506; specifications are for six kinds of pavement, the least expensive being mineral rubber, sarco, and the highest prices, creosoted wood blocks.

Jacksonville, Fla.—City will expend $1,444 in widening Adams st.—Wm. S. Jordan, Mayor.

West Palm Beach, Fla.—Palm Beach County is considering $200,000 expenditure in construction of hard-surfaced or macadamized roads throughout county, and for erection of bridge across Loxahatchee River at Jupiter; material, native rock and shell; construction by both contract and convict labor.—W. M. Pope, Deputy Clerk.

Atlanta, Ga.—Paving of Marietta and Decatur sts. is being urged.

Belleville, Ill.—Council is considering improvement of Illinois st.; cost, $12,000; High st., $8,725; Church st., $8,630; and Jackson st., $5,250.—C. H. Beineke, City Clerk.

Chicago, Ill.—Members of Board of Local Improvements, representatives of Traction Co. and City's Board of Supervising Traction Engineers will meet to decide what streets can be repaved next spring; many miles of pavements, which have been approved by courts, are held up pending relaying of car tracks. Improvements on which the city is ready to start and on which companies are holding them up number: Chicago Railways Co., 14; Chicago City Railway Co., 5; Chicago Consolidated Traction Co., 14; Calumet & South South Chicago Railway Co., 6; Southern Street Railway Co., 2; Chicago & Southern Traction Co., 1.

Chicago, Ill.—West Side Commercial League will consider proposed paving of Milwaukee ave. with granite block pavement. O. Schulz, 373 Milwaukee ave., President.

Joliet, Ill.—Board of Local Improvements will ask for $53,000 appropriation for general improvements.

Des Moines, Ia.—Property owners of 31st st. have petitioned Council for paving of that street with taroid macadam.

Mt. Pleasant, Ia.—Council has decided to pave North Adams st.

Hutchinson, Kan.—Bids have been ordered advertised for extension of Adam st. paving.

Independence, Kan.—Property owners of 11th st. are urging City Commissioners to change the material for the paving of that thoroughfare from brick to Sarco macadam.

Lexington, Ky.—Board of Public Works has decided to widen Winslow st.

Louisville, Ky.—Falls City Construction Co. will purchase new or second-hand concrete mixer.

St. Bernard Parish, La.—St. Bernard Parish will expend $1,550 in shelling Fagendeville lane.—Sebastian Roy, Superintendent, First Road District.

Baltimore, Md.—Business men are urging widening of Saratoga st.

Haverhill, Mass.—Council is planning to expend $125,000 on street work during year. —G. E. Hutchins, City Engineer.

Minneapolis, Minn.—Garfield st. will be opened and extended.—John Moran, Chairman, Commissioners.

Eupora, Miss.—Council has passed resolution calling for $10,000 bond issue for concrete sidewalks.

Alton, Mo.—Grafton Road Association will build seven miles of macadamized road during the winter.—C. F. Beuch, President.

St. Joseph, Mo.—Council has passed an ordinance to pave two streets with Hassam and to grade 15th st.

Florence, Neb.—County Commissioners have reported in favor of opening road on west limits of Florence.

Laconia, N. H.—Laying out of Pleasant and Main sts. is being considered.

East Orange, N. J.—Council has passed ordinance for opening of Woodland ave.

Jersey City, N. J.—Street and Water Board has adopted revised specifications for repaving of Bergen ave. Board also intends to repave Bergen ave. from Highland to Sip ave. with wooden blocks; wooden blocks are likewise to be put down from Glenwood ave. to Highland ave.; other streets that are to be paved with wooden blocks are 1st st., Baldwin ave., Grove st. and 15th st.

Milford, N. J.—Petitions are being circulated for macadamized road from Milford to Flemington, by way of Mt. Pleasant, Everittstown, Pittston, Quakertown and Cherryville.

Millville, N. J.—Council and Cumberland County Board of Freeholders are considering improvement of road between Malaga and this city through Landis Township.

New Brunswick, N. J.—Paving of Remsen ave. and four streets is being considered; ordinance has been passed for paving 21 streets.

South Orange, N. J.—Wyoming ave. will be extended to West Orange line.

Trenton, N. J.—State Highway Commission is considering improvement of 800 miles of highway, main links of which would connect every county seat in State. Address State Road Commissioner Gilkyson.

Buffalo, N. Y.—Repaving of Seneca st. with Medina block is being urged.

New Rochelle, N. Y.—City has awarded $46,700 grade crossing bonds to Yonkers Savings Bank.

Schenectady, N. Y.—Paving, grading and curbing of three streets is being considered.

Raleigh, N. C.—Board of Aldermen is considering paving of Fayetteville st.; estimated cost, if paved with brick, $37,000.

Grand Forks, N. D.—Plans have been prepared for repaving 8,700 sq. yds. in Paving District No. 14.—J. D. Taylor, Mayor.

Grand Forks, N. D.—Plans will be prepared for repaving 28,000 sq. yds. on Alpha ave. and University ave.—J. D. Taylor, Mayor.

Cheviot, O.—Bids will be received Jan. 10, noon, for $10,000 bonds for improving existing streets.—Chas. Craig, Village Clerk.

Cincinnati, O.—Council is considering resolution for establishing grade of Jerome st. and for its paving with brick; cost, $12,000.

Dayton, O.—County Commissioners have signed up a contract with C. J. Neisley, of the State Highway Department, agreeing to macadamize one mile of the Cincinnati pike under the provisions of his proposition whereby the State agrees to pay one-half the cost of the work and the Commissioners and the Township Trustees each 25 per cent., or the other half of the expense; mile of road that will be improved is lying between corporation line and Carrmonte; work will begin in spring.

Dayton, O.—Council has decided to improve Wilkinson st.—E. E. Burkhart, Mayor.

Oak Harbor, O.—Sandusky County Commissioners and Trustees of Rice, Ballville and Sandusky Townships have decided to improve Sandusky County's portion of Harrison State road, which will extend from Columbus to Port Clinton, on Lake Erie; cost about $80,000.

Portsmouth, O.—Council has sold $72,000 street improvement bonds to Breed & Harrison, Cincinnati.

Albany, Ore.—County Commissioners are considering construction of crushed rock road through county.

Portland, Ore.—City will pave following streets with hard surface material during year: Killingsworth ave., at about $150,000; Alberta st., distance 23 blocks, at $75,000; Sumner st., Mississippi ave., Rose City Park Drive and 28 miles of other streets in the Rose City Park District; Multnomah st., Broadway, East 11th and East 13th sts., at $12,000; East 8th st. for the same distance, at $6,147; Schuyler st., at $25,334; East 10th st., at $6,065, and Hancock st., at cost of $24,241.

Roseburg, Ore.—Douglas County will spend about $125,000 on roads this year.

Bethlehem, Pa.—Widening of Ettwein st. is being considered.

Chambersburg, Pa.—Paving portion of Philadelphia ave. with Porter bricks is being considered.

Pittsburg, Pa.—Council has taken first step to give city new downtown district to be brought about by removal of the "Hump" and widening and regrading of streets to be affected by the "Hump" cut; ordinances, recently voted upon by people and authorizing the city to issue bonds to cover cost, has been introduced and referred to Finance Committee.

Pittsburg, Pa.—Council is considering ordinance appropriating $5,000 for paving Brownsville road.

Scranton, Pa.—Council has decided to pave Green Ridge st. with asphalt; paving of Drinker st. with brick is being considered.

Narragansett, R. I.—Council is to ask for bids for construction of piece of macadam road on Ocean rd. at Pier.

Sioux Falls, S. Dak.—Property owners along Duluth ave. are urging paving of that street.

Abilene, Tex.—Citizens have voted $50,000 street improvement bonds; work will begin on downtown streets early in 1910.

Amarillo, Tex.—Council has ordered election Jan. 24 at which citizens will vote on adopting act empowering a city or town to pave or otherwise improve its streets by assessments against property abutting.

Beaumont, Tex.—Paving of Liberty ave. with bitulithic material is being urged.

Dallas, Tex.—County has sold $150,000 road bonds to City National Bank.

Galveston, Tex.—David M. Picton & Co. will purchase one-cubic-yard concrete mixer.

Salt Lake City, Utah.—Bids will be readvertised for construction of sidewalk extension No. 136.

Richmond, Va.—Pulaski County has voted $70,000 bonds for building good roads.

Bellingham, Wash.—Plans have been completed for boulevard to be built along water front.

Ellensburg, Wash.—City has decided to pave Pearl st.

Everett, Wash.—Paving of Grand ave. with brick and asphalt is being considered.

Hoquiam, Wash.—Council has passed ordinances for improvement of six streets; cost, $215,500.

Kennewick, Wash.—Paving of number of streets is being considered.

Spokane, Wash.—Highway Commissioner Bowlby, Hutton Block, will at once advertise for bids for installation of rock crushing plant at Marshall.

Spokane, Wash.—Mission ave. property owners will petition Council for more than a mile of paving on that thoroughfare; there will be a 22-ft strip of parking in the middle and 26 ft. of paving on each side.

Spokane, Wash.—Council will pass ordinance in near future reducing period of maintenance of paved streets from ten to five years. Secretary Armstrong, of Board of Public Works, is figuring up large amount of paving that is to be done during coming spring and summer.

Tacoma, Wash.—Council is considering improvement of South J st.

Woodland, Wash.—F. A. Kittredge, Engineer, and State Highway Commissioner H. L. Bowlby, Olympia, are making surveys of State Road No. 15, from city to Ariel, distance 15 miles.

Platteville, Wis.—City will pave Main st. with brick during coming year to Water st.

Racine, Wis.—Street Committee has reported in favor of paving Carlisle ave. with brick.

BIDS RECEIVED AND CONTRACTS AWARDED

Napa, Cal.—George E. Errington has been awarded contract for macadamizing Third st. for $3,100.

Jacksonville, Fla.—The Board of County Commissioners has awarded the contract for the construction of 2¼ miles of brick paving on the Pablo Beach road, on which four bids were submitted for grading, curbing and paving, as follows: Peninsula Engineering Co. awarded contract; grading, 15c. per cu. yd.; paving, $1.54½ per sq. yd.; vit. curbing, 18c. per lin. ft. Logan Coal & Supply Co., grading, 16½c. per cu. yd.; paving, $1.12½ per sq. yd. The Graves-Mathews Paving Co., grading, 20c. per cu. yd.; paving, $1.66 per sq. yd. and 20c. per lin. ft. of curb. H. Lowe, grading, 22c. per cu yd. Bids were also opened for furnishing the county with two 7-ton road rollers of the standard gasoline type, to be delivered within three weeks, as follows: Austin-Western Co., two standard American motor road rollers for $4,300, to be paid for within three years, with 6 per cent interest; the Kelly-Springfield Road Roller Co., two rollers for $4,900; these rollers offered are of the horizontal engine type, with band wheel and power steering device; John G. Christopher Co., six-ton roller for $1,817.50, and eight-ton roller for $2,343, cash on delivery. No definite action was taken, the matter being deferred until a later date.

Alton, Ill.—John Struble has contract for paving Wall st. at $1.13 per sq. yd.

Piper City, Ill.—The contract for paving the streets of Piper City, Ford County, was let to Contractor Finley, of Hoopeston, at $14,780.

Rochelle, Ill.—A. E. Rutledge, of Rockford, has secured the contract for 30,000 sq. yd. of paving here, for about $53,340.

Rock Island, Ill.—Bids were opened, Dec. 18, for paving 9th ave. and the contract has been awarded to the City Constr. Co., of Davenport, as follows: 18,200 cu. yd. excav., 35c.; 3,970 sq. yd. brick paving, $1.62, and 3,070 ft. concrete curb and gutter, 60c.; total, $14,643. The McCarthy Improv. Co., Davenport, bid for work $15,023.

Winnetka, Ill.—James Cape & Sons, Racine, Wis., have been awarded a $20,000 paving contract, the material to be brick on concrete foundation. The Town Board has let out contracts for paving jobs to the extent of $100,000, divided up between Chicago and Lake Forest contractors, the work to be done in the spring.

Elkhart, Ind.—Board of Public Works has awarded contract for paving 9,597 sq. yd. of paving on Marion st. to Andrews Asphalt Paving Co., of Hamilton, O., for $24,126.

Indianapolis, Ind.—Following are lowest bids received by Board of Works for improvements: 28th st., cement walks and stratified curb, Lanikan & Kincade, $1.29; and 28th st., grading roadway, Lanikan & Kincade, 31c.

Arkansas City, Kan.—Rushmore & Gouty, of Cherryvale, have secured contract for paving Chestnut ave. with paving blocks on 6-in. concrete base and asphalt fill at $1.53 per sq. yd. and paving 6 alleys with paving blocks at $1.53 per sq. yd.

Greenville, Miss.—City has awarded contract to J. S. Allen, city, to lay 4,000 linear feet of granolithic sidewalks on Smith st. William Yerger, Mayor.

Flemington, N. J.—Contract for macadamizing one mile Ashbury-Ludlow Station Rd., bids opened Dec. 16, has been awarded to M. Irving Demarest, of Sea Warren, for $6,823.—Grant Davis, of Whitehouse Station, County Engineer.

Gloucester, N. J.—With the announcement by Council that the contract for street improvements had been awarded to the P. A. Stewart Co., of Gloucester, John F. Kerwin, a contractor of New Brunswick, N. J., who also submitted bids, gave notice that he would ask the courts for an injunction to restrain the carrying out of the contarct until he can appeal for redress. Kerwin says that his bid was lower than the Stewart Co., and that he deserved the contract. Councils declared that Stewart had the lowest bid. The accepted bid was $19,645 for street improvements, $21,600 for macadam, and $11,975 for Amiesite.

Brooklyn, N. Y.—Contracts for paving were awarded by Borough President Bird S. Coler, Dec. 7, as follows: For regulating and repaving with granite pavement on a concrete foundation the roadway of Flushing ave., together with all work incidental thereto, to Leo E. Kelly, 651 Belmont ave., $48,587; roadway of Manhattan ave., together with all work incidental thereto, to O'Grady Bros., $59,460.

Buffalo, N. Y.—German Rock Asphalt & Cement Co. has secured contract for paving Main st. at $22,380.

The bid of F. V. E. Bardol for repaving with brick Jefferson st. was recommended for award at $21,500 by Aldermanic Street Committee.

Long Island City, L. I., N. Y.—Barber Asphalt Paving Co., 30 Church st., New York City, has secured contract at $19,994 for regulating, grading, curbing, paving with asphalt block and laying sidewalks in new diagonal street to Thomson ave. at intersection of Van Dam st.; highway is to be 100 ft. in width.

Contract for regulating and grading Jackson ave. from Woodside ave. to Trains Meadow Road, requiring 129,000 cu. yd. of embankment, is awarded to Hicks, Johnson & Co., 150 Jackson ave., at $50,184.

Cooper & Evans, 220 Bway., secured contract for regulating and grading S. Washington Pl. for $48,040.

Following are lowest bids opened by Borough President Gresser for street improvements: For flagging sidewalks on 6th ave. and paving Bway. with asphalt blocks on concrete foundation, the Sicilian Asphalt Co. at $19,355; for regulating, grading and laying sidewalks on 4th ave., John F. Clancy, $7,434; for the same work in Woolsey ave., from 2d ave. to Halsey st., the Astoria Constr. Co., $13,439; regulating and grading Hunter's Point ave., Degnon Realty & Improvement Co., $12,000; for grading and laying sidewalks on Woolsey ave. from 10th ave. to Park Pl., James V. Troisi, $10,834.

New York, N. Y.—Bids were opened by Park Board, Dec. 23, for regulating, etc., and laying rock asphalt mastic walks and making other improvements in the grounds

Naperville, Ill:—Bids were opened Dec. 20 by the Board of Local Improvement, for furnishing material, grading, draining, curbing and paving with brick on a concrete foundation a system of roadways from plans of W. S. Shields, Engineer, 1201 Hartford Bldg., as follows: (a) Logan & Giertz, Elgin; (b) Marquette Con. Co., Chicago; (c) A. E. Rutlidge, Rockford; (d) H. G. Goelitz, Oak Park; (e) John Hayes, Sons Co., Naperville; (f) Blaine & Brown, Columbia City, Ind.; (g) Illinois Cement Contracting Co., Springfield; (h) J. E. Salfisberg, Aurora; (i) Federal Improvement Co., Chicago.—Alvin H. Biedleman, Secretary.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
400 lin. ft. 8-in. tile drain.....	$0.35	$0.50	$0.50	$0.30	$0.30	$0.25	$0.35	$0.40	$0.46
350 lin. ft. 10-in. tile drain.....	.40	.60	.60	.35	.40	.30	.40	.50	.57
450 lin. ft. 12-in. tile drain.....	.45	.70	.70	.42	.50	.40	.52	.60	.70
1,150 lin. ft. 15-in. tile drain.....	.55	.80	.80	.60	.60	.60	.65	.70	.82
360 lin. ft. 24-in. tile drain.....	1.25	1.50	1.50	1.10	1.15	1.20	1.25	1.40	1.90
30 inlets in place.....	10.00	12.50	12.00	12.00	12.50	13.00	11.50	11.00	10.00
68 cast-iron crossings covers...	2.50	3.00	3.00	5.00	3.00	4.00	7.50	3.00	6.00
68 Concrete bulkheads.....	3.00	4.00	2.00	3.50	3.75	2.00	3.50	2.00	2.00
6 brick manholes, complete..	18.00	20.00	20.00	22.00	20.00	20.00	23.50	18.00	20.00
31 manholes, adjusted.....	2.00	3.00	1.00	2.00	2.00	2.00	3.00	2.00	1.50
780 lin. ft. conc., curb & gutter.	.45	.55	.50	.47	.55	.49	.40	.45	.50
7,600 lin. ft. concrete curb.....	.23	.40	.35	.36	.32	.28	.24	.30	.45
160 lin. ft. curb wall repairs....	1.00	1.00	1.00	.50	.30	.50	.70	.60	.80
9,200 cu. yd. grading.....	.30	.40	.30	.40	.38	.33⅓	.31	.35	.38
31,000 sq. yds. brick pavement....	1.75	1.81	1.76	1.82	1.73	1.76	1.79	1.80	1.77
720 lin. ft. 3 x 12-in. oak head'rs	.15	.30	.20	.30	.15	.15	.15	.15	.20
Totals.....	$61,786	$66 884	$63,814	$66,150	$62,748	$62,812	$63,636	$64,609	$65 748

adjacent to the new comfort station opposite Grant's Tomb, in Riverside Park, and the lowest bid was that of Chas. L. Doran Contr. Co., 1015 Walton ave., Bronx, as follows: 6,000 cu. yd. earth excav., 50c.; 100 cu. yd. borrowed fill in place, 10c.; 6 walk basins complete, ea., $50; 210 lin. ft. 6-in. vitr. drain pipe, $1.25; 300 lin. ft. 8-in. vitr. drain pipe, $1.50; 6,500 sq. ft. asphalt walk pavmt., 22c.; 3,500 cu. yd. mold, $2; 80,000 sq. ft. sod, 2c.; 700 lin. ft. 3-rail pipe fence, 85c.; total, $14,647. Other bids received were Atlanta Contr. Co., 434 E. 91st st., $21,075, and Cooper & Evans Co., 220 Bway., $18.131.

Bids were opened Dec. 16 for furnishing materials and grading for laying asphalt block pavement on Bronx and Pelham Parkway, from White Plains Rd. to bridge over the tracks of the N. Y., N. H. & Hartford R. R., and lowest bid was that of the Hastings Pavt. Co., 25 Bway, as follows: Earth excav., 2,050 cu. yd., 50c.; rock excav., 2,880 cu. yd., $1.50; filling in place, 21,540 cu. yd., 45c.; dry retaining walls, 50 cu. yd., $2.50; brick culvert masonry, 20 cu. yd., $20; asphalt block pavt., 28,450 sq. yd., $2.54; receiving basins, 6, ea., $175; road basins, 10, ea. $50, and 12-in. vitr. drain pipe, 1,200 lin. ft., $1; total, $90,576. Totals of other bids: The Barber Asphalt Paving Co. 30 Church st., N. Y. City, $96,492, and Sicilian Asphalt Paving Co., 41 Park Row, N. Y. City, $94,154.

Cooper & Evans Co. 220 Bway., has secured contract for constructing southerly portion of Colonial Park for $83,086, bids opened Dec. 2.

Schenectady, N. Y.—Union Paving Co. has been awarded contract for paving with asphalt Altamont ave.; bid was $2.20 per sq. yd. for asphalt, $2.42 per sq. yd. for brick, and 49c. per cu. yd. for excavation. Bid of the Schenectady Contracting Co., the only other bid received, was $2.20, $2.45 and 50c., respectively, for same work.

Ironton, O.—The Board of Public Service has allowed the contract for paving 4th st. to the Ironton Construction Co. at their bid of $12,859.40; peebles brick and pitch filler were adopted.

Bradford, Pa.—South Shore Construction Co., Erie, has been awarded contract to build about 7,000 ft. of macadam road in McKean county; work will be started in spring; contract price is $14,833.51.

Harrisburg, Pa.—Highway Commissioners on Dec. 18 opened bids as follows for repairs to sheet asphalt pavement for a period of 5 years—a on group "A," 154,479 sq. yd., b on group "B" 1,560 sq. yd., and c on group "C," 344,106 sq. yd.; Central Constr. & Supply Co., a $10,800, b $3,300, c $3,400; Warner-Quinlan Asphalt Paving Co. of Syracuse, N. Y., a $10,800, b $1,500, c $6,000; Filbert Paving & Constr. Co., of Philadelphia, a $13,630, b $8,780, c $9,865; Chas. P. Walter, of Harrisburg, a $,9850, b $2,250, c $3,400.

Johnstown, Pa.—Council has opened and read 15 bids for doing $140,000 worth of street paving. Among local contractors bidding were George W. Clark, Charles H. Suppes. Jr., Mr. Griffith, James & Fulton, S. H. Killen and John Best & Son.

Smethport, Pa.—South Shore Constr. Co. of Erie, has secured contract for 7,000 ft. of macadam road in McKean County, for about $14.833.

Knoxville, Tenn.—Gore & Smith have contract at 76c. per yd., for the laying of the sidewalk on South Bway., between Clinch and Cumberland aves.

El Paso, Tex.—The bid of the Texas Bitulithic Co. for the paving of South Oregon st. from 2d to 8th sts. has been accepted by Council.

Houston, Tex.—City has awarded contract to A. T. Lucas, city, at $31.988, to pave with brick Washington ave., San Jacinto, Main and Travis sts.—F. L. Dormant, of Houston, Engineer; H. B. Rice, Mayor.

Houston, Tex.—Harris County Commissioners have awarded contract to Sunderman-Dolson Co., city, for grading Clodine Rd.

Salt Lake City, Utah.—Contracts for the paving of Ninth East st. from South Temple st. to the city limits to the south and the paving of 1st ave. from J st. to Virginia st., were let by the Board of Public Works to P. J. Moran, the lowest bidder; the Ninth East work will cost $151,474.47 and 1st ave. will come to $70,593.35. The prices for the work fall about $43,000 below the estimates of the City Engineer's office. The bids on the Ninth East paving were as follows: P. J. Moran, $151,474.47; McKay & Reid, $180,334.03; Strange & Maguire, $188.111.91; Clark Henery Construction Co., $204,323.86; estimate of City Engineer, $191,052.81. For 5th ave. the following bids were received: P. J. Moran, $70,593.35; Strange & Maguire, $85,764.48; Clark Henery Construction Co., $97,124.77; McKay & Reid, $84,938.12; City Engineer's estimate, $89,921.54.

Norfolk, Va.—C. B. Shafer has been awarded a contract by the Board of Control for curbing and guttering 19th st., Omohundro ave. to Debree ave., at 50c. per lin. ft. A contract for paving Graydon ave. and Blow st. with old materials was awarded to Perry Ruth & Co. at 38c. per sq. yd.

Seattle, Wash.—The contract for the Weller st. paving has been awarded to MacAdam & Co. for $89,755.06.

Tacoma, Wash.—Barber Asphalt Paving Co. has secured contract for paving with asphalt a portion of Yakima ave. for $98,671. Other bids received were as follows: Coast Contr. Co., $108,777; Keasal Constr. Co., $114,660, and Lister Constr. Co., $109,740.

SEWERAGE

Tuscaloosa, Ala.—City has sold $25,000 sewer bonds to First National Bank of Cleveland, O.

Camden, Ark.—Council has passed two ordinances creating two new sewer districts.

East San José, Cal.—Board of Trustees has accepted plans by Town Engineer J. E. Fisher for proposed sewer system.

Los Angeles, Cal.—Plans are being prepared by City Engineer Dewey for sewer system which will care for entire city, with outfall sufficiently large to provide for growth.

Mayfield, Cal.—Town has secured right-of-way to bay for proposed sewer system.

San Bernardino, Cal.—Council has ordered construction of 200 ft of sewer on Fourth st.

Denver, Col.—Board of Aldermen is considering bill authorizing construction of sub-district sewers for sanitary drainage in subdistrict No. 10 of East Side Sanitary Sewer District.

Leadville, Col.—Council is considering purchase of sewer system; present company has offered present system to city if allowed to run it in usual way for four years.

Kissimmee, Fla.—X. A. Kramer, Magnolia, Miss., will superintend construction of sewerage system.

Canton, Ill.—A. T. Maltby, Chicago, is preparing plans and specifications for rebuilding nad enlarging sewer system.

Hoopeston, Ill.—Survey is being made by Civil Engineer Frank Payne for Hoopeston sanitary sewerage system.

Indianapolis, Ind.—Board of Public Works has confirmed resolution for a sewer in Parkway, with branch sewers in one or two streets; cost, $40,000.

Mishawaka, Ind.—Council has decided to construct 12-in. vit. pipe sewer in Beiger st.

Le Mars, Ia.—Council has passed resolution providing for the construction of sewer in blocks 26, 29, 44, 57, 72, and block 7 South Side addition.

Missouri Valley, Ia.—Mayor and City Clerk have signed contract with Iowa Engineering Co. for making of plans and specifications for proposed sewerage system.

Muscatine, Ia.—City Engineer Ryan has been instructed to draw plat and estimate cost of installing sewer system in Fair Oaks.

Topeka, Kan.—New plans will be prepared and bids readvertised for constructing pumping station in Sewer District No. 13.—C. B. Burge, City Clerk.

Baltimore, Md.—Plans are being prepared for construction of rein.-concrete sanitary sewer that will pass under new Union Station; drain 66 in.

Caro, Mich.—City is having plans prepared by Riggs & Sherman, Toledo, O., for improvements to sewer system.

Carthage, Mo.—Mayor Ingram and special committee will visit Independence to inspect septic tanks.

Binghamton, N. Y.—Construction of sewer on James st. will be again taken up by Council.

New Rochelle, N. Y.—City has awarded $39,000 sewer bonds to Yonkers Savings Bank.

Waterville, N. Y.—C. A. Holquit, Chief Engineer State Board of Health, has recommended either abatement of present sewerage conditions or installation of system.

Cincinnati, O.—Board of Public Works has rejected bid of Connelly Construction Co., at $2,232, for sewering Tafel and Wagner sts.

Hamilton, O.—Council has decided to construct sewer in North E st.

Jefferson, O.—Council passed an ordinance authorizing building of sewer system at cost of $25,000; construction work will start early in spring.

Walter, Okla.—O'Neil Engineering Co., Dallas, Tex., has been selected as engineer for proposed sewer improvements; $26,000 bonds available.

Klamath Falls, Ore.—Hot Springs Co. will construct modern sewer system next spring in the two Hot Springs additions and in the railroad addition; pipe will also be laid to carry off hot water from springs.

Klamath Falls, Ore.—Council has adopted plans by City Engineer Zumwalt for installation of sewer system, including septic tank; bids on work of furnishing concrete pipe, constructing septic tank and excavating will be advertised at once.

Springfield, Ore.—Council has rejected all bids received for $20,000 sewer bonds.

Florence, S. C.—Citizens have voted $100,000 bonds for construction of sewer system.

Huron, S. D.—Council has decided to construct sewer on Frank st.

San Antonio, Tex.—City has decided to construct sewers on East Macon and other streets.

Yoakum, Tex.—Council has appropriated $1,600 for preliminary surveys for sewerage system.

Kennewick, Wash.—Installation of sewer system is being considered.

Renton, Wash.—Council has appropriated $300 to lay out lines of new sewer system to cover whole city.

Tacoma, Wash.—Council is considering ordinance for construction of storm sewers along certain streets.

Gravenhurst, Ont., Can.—Plans for sewage systems and disposal plant have been approved by Provincial Board of Health, as were also those of the village of Nipegon, and towns of New Liskeard, Oshawa and Kincardine.

Nanaimo, B. C., Can.—Rate payers will vote Jan. 13 on by-law to raise $100,000 for installation of a sewerage system.

Red Deer, Alta, Can.—Town will lay concrete sidewalks, build septic tank for sewage purification and install new pump.—A. T. Stephenson, Town Commissioner.

BIDS RECEIVED AND CONTRACTS AWARDED

San Francisco, Cal.—Contract for constructing sewers on 31st ave., Clement and 33d st., bids opened Dec. 20, has been awarded to Williams & Belser, Mechanics Savings Bank Bldg., for about $9,699.—Robt. J. Loughery, Secretary Board of Public Works.

Blackfoot, Ida.—Bids were opened Dec. 21 for construction of sewer system from plans of Louis C. Kelsey, of Salt Lake City, Utah, and contract has been awarded to Lindquist & Oren, of Billings, Mont., for $37,556. Other bids received were: R. M. Barsden, & Co., Butte, Mont., $38,324; McMullen Htg. & Plumbing Co., Idaho Falls, $39,859; Jas. Kennedy Cont. Co., Salt Lake City, Utah, $40,990; Carlson-Lusk Co., Boise, $41.304, anad Skogland & Orstrum, Butte, Mont., $42,014.

Chicago, Ill.—Federal Improvement Co. has contract, at $288,040, for the construc-

Mt. Oliver, Pa.—The following are the bids opened Dec. 23 for the construction of 11 miles of sanitary sewers: (a) Jas. F. Ferry & Son, Crafton; (b) M. O'Herron Co., Pittsburg; (c) Neelen & Daly, Pittsburg; (d) Ott Bros. Co., Pittsburg (awarded contract); (e) Thos. Cronin Co., Pittsburg; (f) J. B. Sheets & Co., Pittsburg; (g) Engineer's estimate. The prices bid per ft. for each size pipe include replacing or repaving of 2,120 ft. of brick sidewalk, 6,250 ft. of flagstone walk, 1,145 ft. of cement walk, 1,230 ft. of blockstone streets and 4,750 ft. of brick streets (gravel bed); average depth of system, about 10.5 ft.; about 20 per cent. rock, 30 per cent. shale and 50 per cent. loam; time of completion, 9 months.—Wm. McClurg Donley, Borough Engineer.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)
43,850 ft. 8-in. terra cotta pipe	$0.89	$0.89	$0.85	$0.75	$0.86	$0.87	$0.80
3,633 ft. 9-in. terra cotta pipe	1.15	.92	1.04	1.02	1.00	.95	.95
3,043 ft. 10-in. terra cotta pipe	1.38	.96	1.11	1.25	1.40	1.21	1.20
2,673 ft. 12-in. terra cotta pipe	1.44	1.05	1.45	1.80	1.40	1.12	1.25
3,259 ft. 15-in. terra cotta pipe	2.10	1.74	2.50	1.85	1.70	1.13	1.40
5 tons cast-iron pipe in place	35.00	50.00	50.00	45.00	40.00	60.00	40.00
168 manholes (complete)	42.50	40.00	41.00	42.00	35.00	47.50	42.00
16 flushtanks (class A)	65.00	90.00	70.00	88.00	75.00	135.00	110.00
5 flushtanks (class B)	75.00	90.00	95.00	97.00	90.00	175.00	120.00
8 flushtanks (class C)	100.00	90.00	135.00	120.00	120.00	225.00	140.00
64 lampholes (class B)	6.00	6.00	5.00	7.00	5.00	10.00	6.50
10 cu. yds. concrete (in place)	8.50	9.00	9.00	9.50	9.00	9.00	7.00
100 ft. deep-cut house connections	.50	.60	.65	.40	.90	.75	.30
5 M ft. hemlock lumber (in ditch)	25.00	30.00	40.00	29.00	40.00	30.00	25.00
5 M ft. spruce lumber (cradle)	40.00	30.00	50.00	36.00	50.00	50.00	35.00
Totals	$68,471	$64,181	$67,190	$62,289	$64,527	$66,279	$61,639

tion of the South 53d ave. sewer, between West Madison and West 39th sts; contract provides for the payments for concrete at $6 per cu. yd., lumber sheeting at $15 a 1,000 ft. and rock excavation at $3 a yd.

Mt. Pleasant, Ia.—Burlington Construction Co. has contract for the construction of sewers in this city next year at the following figures: 60c. per lin. ft., including all manholes, drip wells, etc.; 48c. per lin. ft. for all house connections.

Arkansas City, Kan.—E. M. Eby, of Wellington, has secured contract for 3½ miles sewer, as follows: 6-in., 68c.; 8-in., 90c.; 10-in., $1, and 15-in., $1.30; manholes, each, $40; lamp holes, each, $10; flush tanks, each, $75; for each additional ft. of manhole over 6 ft., $3. Robson & Livingston, of Kansas City, secured contract for a 900-ft. lateral 6-in. pipe at 65c.; manholes, each, $35; lamp holes, $5; flush tank, $75.

Detroit, Mich.—Following are bids opened Dec. 18 for construction of Fairview sewer, (a) first section of work on Park View ave., (b) second section on Jefferson ave.: Jas. Hanley, 40 Fort st. W., (a) $24,644, (b) $51,398; John A. Affeld, (a) $47,041, (b) $65,350; J. A. Mercier, (a) $37,481, (b) $67,400; Langley & Jeynes, 681 Toledo ave., (a) $39,000, (b) $46,665.

Lincoln, Neb.—C. D. Campbell, Lincoln, has contract, at $3,091, for the extension of No. 27 St. storm sewer, and at $10,226, for the extension of B st. storm sewer.

Nebraska, Neb.—Inter-Mountain Bridge & Contracting Co., Tecumseh, has contract, at $9,243, for the construction of a sanitary sewer in this city.

Carson City, Nev.—J. S. Burlingame, Rice and Plaza sts., city, has contract, at $385, for constructing 620 ft. of sewer and flush tank; bids were opened Dec. 13.

Sea Girt, N. J.—The firm of B. F. Sweeten & Son, of Camden, was the successful bidder for the erection of a sewage disposal plant at Sea Girt, which will be installed at once in order to be in use at the annual encampment of 1910. The bids were opened in the office of Quartermaster General Murray at Trenton and State Engineer James Owen went over the bids and contracts with General Murray; the bid was $11,336.70. Bidders were John W. Heller, Newark; M. J. Smith, Spring Lake; Wormser-Goodman Co., New York; United Paving Co., Atlantic City, and Harrison Construction Co., Newark.

Gloversville, N. Y.—A. L. Willey, Binghamton, was the low bidder, at $182,243.90, for the construction of a sewage disposal plant and sewerage system; other bids were E. B. Baker and A. M. Banker, $237,145.12; Dean & Havens, $267,367.40; A. E. Brace, $437,253.95; David Peoples, $224,110.95.—Morrell Vrooman, City Engineer.

Alliance, O.—Board of Control received tabulated bids for building of sewage disposal plant and intercepting sewer; first bids were those for sewer to extend from Broadway to new disposal plant, distance of nearly two miles; bids are for vit. pipe, 20, 24 and 30 ins. in diameter, and were as follows:

Sewer bids—J. M. Applegate, city, $31,329; W. J. Irwin Bros., Greenville, O., $38,274; Burns Bros., New Castle, Pa., $36,892; J. C. Devine, city, $30,796; J. O'Neil, Akron, $28,043; James Ferry & Son, Pittsburg, $37,879; W. J. Townsend, Cleveland, $34,681; John Wilson, city, $37,570; Perry Baxter, Lorain, $37,724; E. S. Royer, city, $36,333. This sewer must be completed within nine months from date.

Bids for the sewage disposal plant, with cinders for filter beds, were as follows: Ferry & Son, Pittsburg, $141,253; Pitt Construction Co., Pittsburg, $109,858; Lewis & Kitchen, Chicago, $149,985; W. J. Townsend, Cleveland, $103,084; Burns Bros., New Castle, $125,896; J. C. Devine, city, $92,003; Louis Avoisle, Youngstown, $109,257; E. M. Schafferty & Son, Akron, $101,864; Irwin Bros., Greenville, O., $97,135; work on the disposal plant must begin within ten days from the letting of contract and the plant completed within one year from that date. After hearing the tabulation of bids read, Board decided to reject any and all bids above estimated cost for the work, and then by motion adjourned; contracts will be let to O'Neil for construction of sewer and to J. C. Devine for building of sewage disposal plant, from present indications; estimated cost of the disposal plant, as submitted by Engineer Bradbury, architect, is $95,000, and for construction of the sewer, $33,000.

Sebring, O.—Bids for building of sewage disposal plant were opened Dec. 27 and contract let to John Skeele, of Canton, his bid being lowest and less by $1,600 than what the estimated cost of its building would be; bidders with their figures follow: John Skeeles, Canton, $11,059.08; Bird & Perry, Canton, $11,729,66; Kuhn & Applegate, Alliance, $14,968.44; Perry & Haesly, Youngstown, $15,466.69; Townsend & Co., Cleveland, $17,389.74; Burns Bros., New Castle, Pa., $17,839.22, and J. C. Devine, Alliance, $14,875.52.

Springfield, O.—Daniel Doyle has contract for the construction of a sewer in Yellow Springs st between Main and Washington sts., at the following figures: Sewer pipe, 18-in., $1.35 per ft.; 15-in., $1.25; 12-in., 90c.; 18-in. on 12-in. Y's, $3.20; 15-in. on 12-in. Y's, $2.95; catchbasins, $30.

Providence, R. I.—Board of Control opened bids Dec. 21 for supplies of sewer pipe, etc., and referred them for tabulation; bids were as follows: J. P. O'Connell & Co., of Dorchester; James C. Goff Co., of this city; Waldo Bros., of Boston; E. D. Allen for Manchester & Hudson, of this city; David W. Lewis Co., of Boston; Fisker & Co., Eastern Clay Goods Co.; Portland Stoneware Co.; Warner Miller Co.; Charles Warner Co., and the American Sewer Supply Co.

On sewer pipes the bids ranged from 71 per cent to 75 per cent discount, on granite from $4 to more than $9, on the Portland cement from $1.27 per barrel to $1.64 per barrel, and on natural cement from $1.00 to $1.12 per barrel; some of the bids were on sacks while others took into account rebates.

Dallas, Tex.—The contract for changing certain sanitary sewer lines on Jackson st., near Austin, was awarded to the Dallas Home Improvement Co. at 40c. a lin. ft., and $5.50 for the specials.

Tacoma, Wash.—N. A. Jones will construct Pearl st. storm sewer. He was awarded contract for improvement by Commissioner of Public Works H. J. McGregor. His bid, lowest, was $7,533. Other bids were received as follows: Lister Construction Co., $8,140; Coast Contracting Co., $7,977; E. M. Moore, $8,500.

WATER SUPPLY

Montgomery, Ala.—Council will consider installation of electric pumps to duplicate present reciprocating pumping plant and electric pumping plant for industrial water supply purposes.—A. R. Gilchrist, City Engineer.

Imboden, Ark.—Dr. E. N. F. Sullivan purchased Imboden Power & Development Co.'s water system, and will make improvements.

Calexico, Cal.—City will soon install municipal water system, including new mains, three new reservoirs and an air pressure tank.

El Centro, Cal.—City will engage engineer to prepare plans for water works.

Greeley, Col.—John T. Warren and others will build an immense dam across the Platte River at the narrows; estimated cost $11,000,000.

Lakeland, Fla.—City will let contracts about Jan. 10 for laying mains, installing fire plugs and cut-offs; cost $20,000.—M. Berscheidt, City Clerk.

Lake Park, Ga.—City is considering bond issue for construction of water works.

Bloomington, Ill.—City will readvertise bids for reconstruction of water works.

Galesburg, Ill.—Council has authorized Committee on Water Supply to contract for Columbus pump.

Havana, Ill.—City Engineer Priddy has recommended installation of more powerful pumps at water works.

Anderson, Ind.—City will appropriate $10,000 for water works improvements.

Assaria, Kan.—Construction of water works system is being considered.

Cherokee, Kan.—Council will consider purchase of private water system; boilers, reservoir and pumps will be installed.

Hutchinson, Kan.—State Charter Board has granted United Water, Gas and Electric Co., city, charter to operate plants and distribute light, power and water to city. Incorporators are: G. E. McComber and Guy Gannet, Augusta, Me.; D. E. Tilley, Boston; J. D. Houston, R. S. Elder, Leland Scroggins and F. W. Wetmore, Wichita; Walter Grundy, city, and R. C. Storey, Boston.

Scandia, Kan.—Town is considering installation of water works for fire protection.

Chicopee, Mass.—Board of Water Commissioners has asked for new plans for equipping Fairview water works pumping station.

Gloucester, Mass.—Western ave. water main will be extended in spring.

Lynn, Mass.—Water Board will soon recommend plans for purification of water.—Thomas Campbell, Vice-Chairman.

Grand Island, Mich.—Council is considering improvement of water works system.

Detroit, Minn.—City is considering construction of two miles of 6-in. and 8-in. water mains.—C. G. Sturtevant, City Clerk.

Hibbing, Minn.—Water & Light Commission is considering improvement of water system.

Minneapolis, Minn.—City is considering installation of filtration system.—J. A. Jensen, Engineer, Water Works Department.

Sandstone, Minn.—Town has decided to erect new standpipe.—H. L. Bailey, Superintendent.

Euporia, Miss.—City Council has passed resolution calling for $20,000 bond issue for improving water system, including doubling capacity of present reservoir and installing new pump.

Cape Girardeau, Mo.—City will extend intake out into river on account of sandbar formation.—H. R. Mason, Superintendent.

Marceline, Mo.—City is considering adoption of some method of filtration.—C. L. Johnson, City Engineer.

Hamilton, Mont.—City will extend water mains to Pine Grove.

Beatrice, Neb.—Council has decided to have plans prepared for better pumping and distributing system.—J. R. C. Field, Water Commissioner.

Perth Amboy, N. J.—Board of Water Commissioners will issue $50,000 water bonds.—Wilbur La Roe, City Clerk.

Trenton, N. J.—Board of Water Commissioners will make thorough investigation of all possible methods of purifying city's drinking water.

Claremore, Okla.—Citizens will soon vote on $17,500 water purification bonds and $17,500 water works extension bond.

Clinton, Okla.—Stone Construction Co. desires prices on c. i. pipe and fittings.

Etna, Pa.—Fire has destroyed water and light plant with $100,000 damage; plant will be rebuilt.

New Holland, Pa.—Citizens are urging construction of water works for fire protection, including standpipe, wells, pumps and steam engine.

Pittsburg, Pa.—Resolution, coming from Mayor Magee, has been introduced in Council by John J. Byrnes, providing for employment of consulting engineer to study filtered water question with view of determining whether, when additional land is purchased for filtration plant, it will not be advisable to select another location than Aspinwall, where present filtration plant is located.

Reading, Pa.—Reading Water Department will erect new high service pumping station at its Hampden reservoir, to be used in emergency cases.

Red Lion, Pa.—Water Co. has decided to issue $40,000 bonds for extension of water system, including enlargement of plant and building of a dam and pumping station at Neiman's Mill.

Scottdale, Pa.—Water Co. has decided to install larger mains.

Zellenopie, Pa.—Special committee has

recommended construction of pipe line to Glade Run, distance 1,000 ft.—C. J. D. Strohecker, Chairman.

Florence, S. C.—Citizens have voted $100,000 bonds for improving and maintaining water works and for constructing sewer system.

Salt Lake City, Utah.—Thomas Hobday, superintendent of water works, has suggested that consumers of city water be compelled to buy meters, and he cited fact that he now needs 130 new meters, which will cost $5,000.

Norfolk, Va.—Council has appropriated $6,000 for water distributing system.

Rutland, Vt.—Special committee has recommended resurfacing of reservoir with cement; cost, $15,000.

Spokane, Wash.—Bids will be received Feb. 24, 2 p. m., for $400,000 water works improvement bonds.—Robt. Fairley, City Comptroller.

Tacoma, Wash.—Mayor Linck has recommended following improvements in order to increase supply of water until city builds gravity plant: Digging of large open wells and use of centrifugal pumps; use of Maplewood Springs and installation of metering system.

Glendale, W. Va.—Glendale Water Co. has decided to install water works system; will also manufacture ice, gas and electricity; capital stock, $25,000.

Wheeling, W. Va.—Board of Control will ask for bids for building pump house, both as a whole and for superstructure and substructure separately; all bids received have been rejected.

Edgerton, Wis.—City will drill artesian well.

BIDS RECEIVED AND CONTRACTS AWARDED

San Francisco, Cal.—The Board of Public Works received bids for the construction of the new pumping station at 2d and Townsend sts., and the bid of C. C. Moore Co. for erecting the mechanical equipment for $190,000 was the lowest, but no award was made because the amount is in excess of the estimates. For the steel construction the American Construction Co.'s bid of $50,880 was the lowest and that of the San Francisco Cornice Co. for the sheet copper roofing of $3,295 was the smallest figure for that work. All the bids were referred to the City Engineer.

Cuthbert, Ga.—City has awarded following contracts for improvement of water and light plants: F. J. White, Geneva, Ala., artesian wells; R. D. Cole Mfg. Co., Newnan, Ga., boilers; Fort Wayne Electric Co., Fort Wayne, Ind., electric generators; Filler & Stowell Co., Milwaukee, Wis., engines; Platt Iron Works, Dayton, O., air compressors; bond issue available.—J. B. McCrary & Co., Empire Bldg., Atlanta, Ga., Engineers; D. A. McPherson, Mayor.

Marion, Kan.—Contract for water works and lighting plant was awarded to The Squire Electric Co., of Kansas City, Mo., at $60,000.—Burns & McDonnell, Engineers.

Baltimore, Md.—Board of Awards has given out the contracts for year's supplies Water Department, amounting to about $105,000; contracts were divided among 30 contractors, largest single contract being for c.-i. pipe and fittings to United States C. I. Pipe & Foundry Co., for $55,170.

Gloucester, Mass.—Contract to supply Department with 2-in. galvanized, 2-in., 1½-in., 1¼-in. and 1-in. plain pipe was awarded to L. E. Smith Co., and for c.-i. pipe from 6 to 14-in., to Warren Foundry & Machine Co., of New York, at their bid of $26.25 per ton. Other bidders for the cast-iron pipe were: United States Cast Iron Pipe & Foundry Co., of New York, $26.30; R. D. Wood & Co., Philadelphia, $26.76; pipe is to be delivered f. o. b. in Gloucester. Bids for the smaller grade of pipe were as follows: O. J. Biggs, lump sum of $1,100 for all pipe needed for year; L. E. Smith Co., 2-in. galvanized pipe, 11.9c. per ft.; 2-in. plain, 9.33c.; 1½-in., 7c.; 1¼-in., 5.83c.; 1-in., 4.26c.; L. E. Andrews & Co., 2-in. galvanized pipe, 11.9c.; 2-in. plain, pipe, 9.33c.; 1½-in., 7c.; 1¼-in., 5.83c.; 1-in., 4.27c.; George E. Gilchrist, Boston, 2-in. galvanized pipe, 12.9c.; 2-in. plain pipe, 11.16c.; 1½-in. pipe, 8.37c.; 1¼-in. pipe, 6.91c.; 1-in., pipe, 5.1c.; J. H. Cunningham, Boston, 2-in. galvanized pipe, 12½c.; 2-in. plain pipe, 10.25c.; 1½-in. pipe, 7¾c.; 1¼-in. pipe, 6.5c.; 1-in. pipe, 4.6c.; Warwick Mfg. Co., Boston, 2-in. galvanized pipe, 11.9c.; 2-in. plain pipe, 9.33c.; 1½-in. pipe, 7c.; 1¼-in. pipe, 5.84c.; 1-in., 4.27c.

Sumner & Gerald and A. Morton submitted regular scale prices, with their rates of discount on same, which would bring the 2-in. galvanized pipe at about 13c. per ft., and others in proportion as compared with other figures submitted.

New York, N. Y.—Rodgers & Hagerty, 121 W. 125th st., City, have contract for Contract No. 9 of the Catskill Aqueduct, at $7,953,050, the contract bids for which were opened Dec. 21, calls for the construction of Kensico dam, a high masonry dam across the valley of the Bronx River, and appurtenant works, including New Rye reservoir, New Rye dike, Bronx-Rye tunnel, Bronx dike and Rye pipe-line; the work is located about 3 miles north of White Plains, near Valhalla Station, on the Harlem division of the New York Central and Hudson River R. R., Westchester County, New York; Geo. W. Rogers, 29 Broadway, bid $9,490,725; American Pipe & Construction Co., Philadelphia, $8,349,015, and I. T. Cogan, Brewster, N. Y., $9,762,310.

Elmore & Hamilton, of Schenectady, were successful on Contract 53, bids for which were opened Dec. 16; this contract calls for constructing Grassy Sprain and Ardsley cut-and-cure aqueduct and Platt ave. siphon, including 24,400 ft. plain concrete conduit in open cut and embankment, 17½ ft. wide by 18 ft. high, also 135 ft. reinforced concrete aqueduct of special design. —J. Waldo Smith, Chief Engineer, Board of Water Supply.

Ardmore, Okla.—City Commissioners have let contract to Healey Construction Co. for raising dam at city lake sufficiently to double the capacity of the large lake, which is source of Ardmore's water supply; contract price was $7,300.

Chickasha, Okla.—C. P. Hollingsworth, city, has been awarded a contract for laying 60,928 lin. ft. of 6-in. and 4,610 ft. 8-in. c.-i. water pipe for 12.77c. per ft., total, $8,-369.20. Other bids were: T. C. Brooks & Sons Co., Jackson, Mich., 13½c., total $8,-847.63; E. R. Kerby, Lawton, Okla., 13¾c. for 6-in. and 17½c. for 8-in., total, $8,184.35; G. A. Heman, St. Louis, Mo., 14¾c. and 15c., total, $9,678.38; Freeborn Engineering & Construction Co., Kansas City, Mo., 13¼c. and 18c, total $8,902.76; N. S. Sherman Machinery & Iron Co., Oklahoma City, 15c. and 17½c., $9,945.95; Kinsey & Heaney, Muskogee, 15c. and 15½c., $9,853.75; T. W. Roberts, city, 14½c. and 17c., $9,618.26.—Elmer E. Colby, City Engineer.

Newberry, S. C.—City has awarded contract to Bowe & Page, Augusta, Ga., to extend water system; cost $5,000.

Kanab, Utah.—The Board of Directors of the local irrigation company has let contract to drill a 425-ft. tunnel underneath the proposed dam to Cramm Bros. & Adams, expert tunnelmen, at $3.12½ a ft., tunnel to be completed in 40 days. They will work from each end with three 8-hour shifts.

Seattle, Wash.—The contract for 7,000 water meters has been awarded to the Neptune Meter Co., for Trident meters, making the same type of meter as is now in use, and ten each were ordered of the Worthington, Nash and Keystone types for testing purposes.

Spokane, Wash.—The Board of Public Works has awarded contract for the six pumps and three motors to be installed at the up-river pumping station by May 1, to the Allis-Chalmers Co., for $33,320.

Wheeling, W. Va.—Council has referred the matter of awarding the contract for building the new pump house at the city water works back to the Board of Control for further consideration. The Board had recommended that the contract be awarded to the J. A. Swingle Co., of Zanesville, O., at $89,316, or a little more than $18 over the estimated cost of the structure according to the estimate furnished by J. Richard Kommer, the city's Consulting Engineer on the water works improvements. This contract price covered the cost of both the superstructure and substructure. The Board will ask for bids both as a whole and for the superstructure and substructure separately, as by getting separate bids it may be possible to have the work done cheaper. Only two other bids were submitted, they coming from the Dravo Construction Co., of Pittsburg, and N. C. Hamilton & Son Co., of Wheeling. The Dravo company's bid was $122,995, while that of the home concern was $95,000.

LIGHTING AND POWER

Murfreesboro, Ark.—Pike County Water Power Co. will soon begin construction of water-power electric plant; will transmit minimum of 8,000 electrical h.p. to Hot Springs, 50 miles distant, and Little Rock, 103 miles distant; estimated cost of plant, $600,000.—Claudius Jones, Little Rock, President; Fuller, Coult & Co., Chemical Bldg., St. Louis, Mo., Engineers.

Cloverdale, Cal.—Board of Supervisors has granted franchise to the Cloverdale Light & Power Co. to distribute electricity for lamps and motors over northern section of the county; work on the plant will begin soon.

Woodland, Cal.—Great Western Power Co. has filed articles of incorporation; capital, $25,000,000. Directors are: Guy C. Earl, W. H. Spaulding and B. C. Carroll, Oakland; H. G. Young, W. S. Rheem and L. D. Dimon, Richmond; F. D. Madison, San Rafael.

Wilmington, Del.—American Power Co. has accepted provisions laid down by Levy Court for franchise to erect poles and string wires along county road from New Castle to Delaware City, for purpose of furnishing electric light, and as soon as consent of owners of property along route can be obtained work will likely be started.

Lafayette, Ga.—Council will receive propositions from parties, firms or corporations for installation of electric light and water works plants.—C. J. Hammond, City Recorder.

Waycross, Ga.—Burdette Loomis, President Waycross Gas & Construction Co., has acquired entire system of Waycross Light & Power Co.; various improvements are planned, including modern electric light plant, wood distilling plant and new process gas plant; estimated expenditure $150,000.

Boise, Ida.—Installation of lighting system is being considered.

Freeport, Ill.—Commonwealth Electric Co. has been incorporated by Charles E. Gregory, Richard Armstrong and C. R. Norwood, all of Chicago. Plant will be in operation by spring.

Pendleton, Ind.—A number of Indianapolis and Pendleton men have organized Municipal Light & Power Co. for purpose of establishing electric light and power plant in this city; company has been incorporated with an authorized capitalization of $25,000, and work on the new plant will start as soon as contracts can be let. Ira Holmes, Will A. Holmes, Indianapolis; J. P. Taylor J. B. Parson, Pendleton, and Harry W. Holmes are interested.

Davenport, Ia.—Ordinance granting franchise in city to Davenport Water Power Co. is to be submitted to vote of people.

Sioux City, Ia.—Citizens have defeated proposition to grant new franchise to the gas and electric light companies.

Hutchinson, Kan.—State Charter Board has granted United Water, Gas & Electric Co., city, charter to operate plants and distribute water, light, heat and power to public of this city. Incorporators are George E. McComber and Guy Gannet, Augusta, Me.; David E. Tilley, Boston, Mass.; J. D. Houston, R. S. Elder and Leland Scroggins, Wichita; Walter Grundy, city; R. C. Storey, Boston; F. W. Wetmore, Wichita.

Barboursville, Ky.—Barboursville Electric Light, Heat & Power Co. has been purchased by Pineville capitalists, who will make improvements.

Shreveport, La.—Arkansas Natural Gas Co., Pittsburg, has filed $2,750,000 mortgage and will construct pipe line from Caddo-field to Arkansas cities.—J. C. Trees, President.

Lewiston, Me.—Union Water Power Co. has purchased water power at Clark's Rips,

BIDS RECEIVED ON PUMPING MACHINERY.

City	Name	Capacity 24 Hours	Style of Pump	H.P. Boiler	Pressure H'd P'm'pd Against	Guaranteed Efficiency	Price
Eldora, Ia	Smedley	.....	Power	100	40′	.....	$850.00
Winnipeg, Man	Northern Electric	2,500,000	Turbine	300 h.p. M't'r	125′	63.7 overall	11,000.00
Duluth, Minn	General Electric Co	1,800,000	Plunger	Motor	310′	.....	6,587.50
Hobart, Okla	Prescott	2,000,000	Cross comp. cond. crank and fly-wheel Corliss	.....	120′	112,000,000	6,800.00
Los Angeles, Cal	Prescott	1,333,000	6-cylinder triple direct acting	.....	350′	90,000,000	4,550.00
Daytona, Fla	Rumsey pump Foos engine	1,110,000	Power	.....	200′	.....	5,674.00
Augusta, Kan	Wichita Supply Co	.....	Gas engines	25	.....	.....	1,760.00
	English Iron Works	288,000 each		.....	.....	.....	1,618.00

about eight miles above city, on the Androscoggin River; new and modern dam will be built and big power plant be installed which will develop 11,000 h.p., to supply all mills of city.

Rockville, Md.—County Commissioners have asked for bids for installing electric light wires and other fixtures in Court House.

Salem, Mass.—W. W. Coolidge, City Solicitor, is preparing bill to require that electric wires in city be placed underground; bill will establish underground wire zone having radius of one-half mile from city hall.

Chesaning, Mich.—Council is considering erection of hydroelectric plant on Shiwassee River for furnishing electricity to operate municipal light plant and water works system.

Hatfield, Minn.—La Crosse Water Power Co. will build third dam on east fork of Black River.

New Ulm, Minn.—Council has adopted ordinance granting to Arthur M. Smith, secretary of the Cleveland Co., rights to lay and maintain mains, pipes and fixtures in city for purpose of supplying inhabitants with gas.

Columbus, Miss.—Gilmer Hotel Co. is considering installation of small electric light plant.—S. B. Johnston, President.

Charleston, Mo.—Southeast Missouri Light, Ice & Power Co. will erect power plant; cost $15,000; plans by Matthews & Clarke, Missouri Trust Bldg., St. Louis.

Chillicothe, Mo.—Citizens have voted $50,000 bonds for construction of electric light plant.

Columbia Falls, Mont.—Council is considering granting a franchise for the operation of an electric light plant.

Camden, N. J.—Pine Beach Utilities Co. has been incorporated to manufacture and generate electric current for light, heat and power.—George Kelly, Wm. H. Kern and C. P. Halyburton, incorporators.

Montclair, N. J.—Engineers Runyon and Carey will prepare estimates for construction of municipal lighting plant.

Newark, N. J.—Finance Committee has recommended that all wires be placed under ground.

Thorofare, N. J.—Residents have petitioned for street lamps.

Buffalo, N. Y.—Councilman Burt is urging installation of magnetite type of electric light lamps.

East Norwich, N. Y.—Village is to have lighting district, boundaries of which are to be same as those of School District No. 8 of the town of Oyster Bay.

Lockport, N. Y.—Newfane Electric Light Co. will light village of Wilson for coming year.—Wm. Allbright, President Village Board.

Defiance, O.—Village of Sherwood, Defiance County, has disposed of $4,000 bonds to First National Bank, Bryan, at a premium of $81 for purpose of installing electric lighting plant; plant will be built in spring.

Etna, Pa.—Fire has destroyed light and water plant, with $100,000 damage; plant will be rebuilt.

Narragansett, R. I.—Town will hold special financial town meeting Jan. 17 to take up question of street lighting contract.

Providence, R. I.—Council has granted Narragansett Electric Co. autohrity to erect and maintain wires along Baxter st.

Valley Falls, R. I.—Fire Wardens are considering purchase of electrical apparatus.

Lancaster, S. C.—Lancaster Light & Power Co. has been incorporated with $5,000 capital stock.

Coalville, Utah.—Moses W. Taylor has applied for permission to appropriate 20 cu. ft. per second of water from Chalk Creek, Summit County, to generate electricity for transmission to various towns in Utah; water will be carried through ditch 18,000 ft. in length.

Salt Lake City, Utah.—J. H. Scott, Engineer of the Utah Light & Railway Co., has been engaged by County Commissioners to investigate county's system of lighting, with view of making alterations which will improve present system.

Salt Lake City, Utah.—Board of County Commissioners has decided to light West Temple st. and 14th st., also place additional lights in East Mill Creek.

Tacoma, Wash.—City has sold $100,000 light and power bonds to Well, Roth & Co., Chicago, for $2,155 premium.

New Martinsville, W. Va.—City has granted franchise to New Martinsville Light, Heat & Power Co., R. E. Hall, Chief Engineer, to furnish light for lamps in Brooklyn Junction.

Galesville, Wis.—La Crosse Water Power Co. has made application for franchise permitting the company to run lines into city.

Vancouver, B. C., Can.—British Columbia Electric Co. will expend $250,000 in improvements.

BIDS RECEIVED AND CONTRACTS AWARDED

New Haven, Conn.—United Illuminating Co. has been awarded electric lighting contract for four years, at 20c. per light per night. The Gas Co. has been awarded five-year contract for $134,106; a bid of $85,506 was made for three years.

Fort Wayne, Ind.—Board of Public Works has awarded contract to P. K. Engineering Co., 308 South 8th st., St. Louis, Mo., for installation of a 425-hp. Lyons safety boiler in municipal light plant, at $6,250.

Indianapolis, Ind.—George M. Brill, Consulting Engineer for the new city hall building, has recommended that the contract for the lighting fixtures be awarded to the Sandborn-Marsh Electric Co., and this will be done; the bid was $23,294.50, the lowest figure submitted. Each company bidding on the fixtures bid on its own designs, submitting a figure of total cost. In reaching a decision artistic design and quality of material were given first consideration.

Alexandria, La.—Bids for electric lights and water works extension to cost $40,000, were opened Dec. 20, and after tabulation by Electric Light & Water Works Committee, contracts for electrical apparatus were awarded to the Westinghouse Co., Pittsburg, Pa.; Erie Boiler Co., of Erie, Pa., and U. S. Cast Iron Water Pipe Co., Birmingham, Ala. These recommendations will go to the Council to be ratified. Following companies bid on these propositions: On electrical material: General Electric Co. and Westinghouse Electric Co. Electric switchboard: General Electric Co., Westinghouse Electric Co. and Independent Electric Co., of Kansas City, Mo. Boiler: Babcock & Wilcox, Erie Boiler Works, the Heine Boiler Co., Casey & Hedges, the Harry Vogt Co., the John H. Murphy Co., American Cast Iron Water Co., and Dimmick Water Pipe Co. Boring deep well; Clifford Deep Well Co., Texarkana, Ark., bid being too high was rejected.—J. P. Turregano, Mayor.

Essex, Mass.—Town will contract with Gloucester Electric Co., for lighting town at $1,600 per year on 7-year contract.

Ironwood, Mich.—Contracts for equipment for proposed gas plant have been awarded to Kerr-Murray Mfg. Co., of Fort Wayne, Ind., and the Gas Machinery Co., of Cleveland, O.; cost about $60,000.—Henry I. Lea, 616 Rookery Bldg., Chicago, Ill., Engineer.

Eveleth, Minn.—The contract between the city and the Home Heating & Electric Co. for the city lighting for a period of five years, at $10 per arc lamp for the first 40 lamps, and $8 per lamp for any over that amount, and 8c. per k.w. hour for city building lighting, has been adopted by Council. The Home Heating & Electric Co. served notice that, commencing Jan. 1, all business consumers of electricity would be charged 10c. per k.w hour, instead of 12c., the present rate. This new rate will not apply to residences or churches.

Omaha, Neb.—Council has made three-year contract with local electric light company; on basis of present number of lights, average cost per lamp per year will be $57.75.

Perth Amboy, N. J.—The Public Service Corporation has been awarded contract to furnish 250 or more electric arc lamps of 2,000 nominal c.p. for a term of five years from Jan. 1, 1910, at $80 per lamp per annum, they being the only bidder.

Oswego, N. Y.—The contract for lighting the city streets and city hall has been signed by Commissioner of Works John Smith and A. B. Tenny, President of the Tenny Syndicate controlling the People's Gas & Electric Co. The cost aggregates $26,000 a year and is for a term of five years. There are 328 arc light at the rate of $66 each per annum, 20 incandescent lights at $18 per year each, and 427 16-c.p. incandescent lights at $3.65 each.

Sea Cliff, L. I., N. Y.—Nassau Light and Power Co. has the contract for lighting village of Sea Cliff for another three years.

Columbus, O.—The contract for the new turbine engines to be installed in the power plant in the penitentiary has been let by the Prison Board of Managers to the Allis-Chalmers Co. of Milwaukee, its bid being $33,800 and the lowest submitted.

Mercer, Pa.—Contract for equipment for new power house at the Court House has been let to American Heating, Ventilating & Supply Co., 735 Penn ave., Pittsburg, at $19,918.

Hamilton, Ont., Can.—Council, Dec. 20, awarded contracts for motors and transformers for Beach pumping station to Canadian Westinghouse Co., for $16,626, and to same company for two motors and other equipment, including a lighting plant for 50 lamps, at the new annex disposal plant, for $4,000; contract for pumps for Beach pumping station was awarded to John McDougall-Caledon Iron Co., Montreal, for $7,220.

FIRE EQUIPMENT

Piedmont, Cal.—Purchase of engine and erection of fire station are being considered.

Redding, Cal.—Fire Chief Poole has recommended to City Trustees that $5,000 be invested in 40-h.p. automobile combining properties of a hose cart, hook and ladder wagon and a chemical engine.

Ross, Cal.—Town is considering purchase of automobile chemical and hose wagon.

San Bernardino, Cal.—Council placed matter of purchasing automobile chemical engine at cost of about $5,000 in hands of Fire Department.

San Rafael, Cal.—Board of City Trustees has ordered Fire Chief Schneider to call for bids for installation of modern fire alarm system.

Bridgeport, Conn.—Fire Commission has decided to ask for $200,000 appropriation.

Naugatuck, Conn.—Freemen have voted to accept recommendation of Board of Warden and Burgesses for erection of fire house, cost $23,000, on Maple st.

New Britain, Conn.—Board of Public Safety has made following recommendations: Purchase of combination chemical and hose automobile; erection of new station in southwest section and installation of combination hook and ladder and hose truck carrying a 35-gal. chemical tank therein; purchase of site for location of No. 2 engine company; erection of standpipe or reservoir in northwest section, and installation of fire whistle which can be heard throughout city. Address Chief Dame.

Galesburg, Ill.—Business men on Main st. are urging purchase of fire engine.

Tallula, Ill.—Need of fire apparatus is being urged.

Muscatine, Ia.—Chief Hagerman has recommended purchase of two head protectors.

Covington, La.—Jefferson Fire Co. has decided to improve its equipment.

Milton, Mass.—Town will purchase auto for Chief Choate.

Newton, Mass.—Purchase of $5,500 motor truck is being considered.

Taunton, Mass.—Council will consider erection of fire house in Ward 7.

Winchendon, Mass.—Selectmen are considering installation of better fire-alarm system.

Ionia, Mich.—Chief T. McGannon has recommended purchase of 800 ft. more hose.

Le Roy, Mich.—Town is considering purchase of more fire apparatus.

Port Huron, Mich.—City will soon advertise for bids for proposed North End station.

Minneapolis, Minn.—Bids will be received Jan. 6, 2 p. m., for $25,000 fire department bonds.—D. C. Brown, City Comptroller.

Galena, Mo.—Fire Committee is considering purchase of auto chemical engine, cost about $4,000; also erection of modern equipped fire station.

St. Joseph, Mo.—City will purchase quantity of fire hose early in year.—P. P. Kane, Chief.

St. Louis, Mo.—Plans are being prepared by F. A. Huser, city hall, for $16,000 engine house No. 36.

Omaha, Neb.—Chief Selter will purchase fire hose; $23,300 is available.

Montclair, N. J.—Establishment of call fire department instead of volunteer organization is being considered.

Morristown, N. J.—Installation of paid fire department is being considered.

Newark, N. J.—Finance Committee has recommended that site be purchased south of Clinton ave. for erection of truck house.

New Brunswick, N. J.—Raritan Engine Co. has petitioned for new hose wagon.

Trenton, N. J.—Fire Commissioners and Chief Allen are considering advisability of entirely doing away with horses as means of propelling fire-fighting apparatus.

Rutherford, N. J.—Wallington Council will purchase 200 ft. of hose.

Carthage, N. Y.—Board of Trustees will appropriate $1,300 for new hose and chemical wagon combined.—Fred Morrison, Chief.

Cohoes, N. Y.—Fire Chief has recommended purchase of new hook and ladder truck and motor-driven chemical and hose wagon.

Crestwood, N. Y.—Citizens' Association has petitioned for equipment for hose.

Poughkeepsie, N. Y.—Chief G. Nagengast has recommended that new hose wagon and 2,000 ft. of new hose be purchased for Washington Hose Co. No. 3.

Madisonville, O.—Bids will be received Jan. 26, noon, for $3,500 bonds for erection and equipment of fire house.—J. D. Conant, Village Clerk.

Erie, Pa.—Council has voted to purchase 4,000 ft. of additional fire hose.

Frankford, Pa.—Rockledge Volunteer Fire Co. is urging purchase of 200 ft. of hose.

Jenkintown, Pa.—Old York Road Fire Co.,

Ashbourne, is considering purchase of automobile apparatus.

Lancaster, Pa.—City is considering purchase of modern truck and combination quick-raising aerial truck, hose wagon and 35-gal. chemical tank with 2½-in. outlet to every 250 ft. of chemical and 2½-in. outlet, with total of 1,000 ft. for each company; also, hose wagon with turret-pipe to carry 1,000 ft. of 3-in. hose.

Mauch Chunk, Pa.—Diligent Hose Co. No. 3, Ward Two, is securing funds for purchase of steam engine.

Reading, Pa.—City will purchase hose drier.

Shenandoah, Pa.—City is considering need of new fire plugs and relief valves, nozzles and smoke protectors for Fire Department.

York, Pa.—Devotion of his entire time to the care of fire alarm system by city electrician; installation of an automatic repeating machine to automatically cut defective circuits; increase of number of circuits to six, and installation of punching registers at engine houses will be most important things that will be recommended for adoption by city for Fire Department in report of National Board of Underwriters.

Denison, Tex.—Purchase of auto fire engine is being considered.—Address Mayor Acheson.

Sunnyside, Wash.—Purchase of 2,500 ft. of fire hose and auto cart, also installation of fire alarm system are being considered.

Tacoma, Wash.—Council is considering ordinance directing Commissioner of Public Works to advertise for bids for 5,000 ft. fire hose.

Milwaukee, Wis.—Messmer & Son are preparing plans for new central fire station on Broadway; $50,000 will be appropriated.

BIDS RECEIVED AND CONTRACTS AWARDED

Oakland, Cal.—Bids were received by the Board of Public Works for the construction of a fire engine house at 56th and Dover sts., to furnish one steam fire engine and a combination chemical and hose wagon for the fire department. The bidders on the construction of the engine house were: E. C. Bridgeman, $13,950; Ackerman & Son, $11,795; Wm. L. Boldt, $12,685; O. M. Magnessen, $11,983; C. N. Grant, $13,205; Sommarstom Bros., $15,880; C. A. Johnson, $13,175; Smith & Ormsby, $12,712. The bids on the steam fire engine were: Ahrens Fire Engine Co., $6,100; Nott Fire Engine Co., $6,250; American La France Fire Engine Co., $5,995. The bids on the combination chemical engine and hose wagon were: the Anderson Coupling & Fire Supply Co., $1,644; the Seagrave Co., $2,109; Robinson Fire Apparatus Manufacturing Co., $1,760; American La France Fire Engine Co., $1,750. All of the bids were referred to the Fire Marshal and City Attorney.

San Francisco, Cal.—Board of Public Works has awarded contract to Lang & Bergstrom for construction of house for Chemical Engine No. 12, at a cost of $22,618.

Peoria, Ill.—For the sum of $19,000, payable in three annual instalments of $6,334 each, with interest at the rate of 5 per cent, the Gamewell Fire Alarm & Telegraph Co. offers to replace the present patrol and fire alarm system with its new telephonic and automatic flashlight system in a proposition to the City Council. The company proposes to install 72 patrol boxes with 80 bells and 80 flashlights and have them ready in 30 days from the signing of the contract. The matter was referred to the Police and Judiciary Committee.

Vincennes, Ind.—Contract has been awarded to Webb Motor Fire Apparatus Co., city, for an automobile chemical and hose wagon for $4,250.

Vincennes, Ind.—Representatives of seven hose manufacturing firms submitted bids for 1,000 ft. of fire hose, and after all had been given a hearing the Board let a contract to the Chicago Fire Hose Co., of Chicago, for 500 ft. at $1 a ft. and another for the same amount and at the same price to the B. Lateral Co., also of Chicago. Other firms represented were the Boston Rubber Co., Dayton; New Jersey Car & Rubber Co., Chicago; Eureka Co., Chicago; Gutta Percha Rubber Co., Chicago, and the New York Belting & Packing Co., Chicago.

Lawrence, Mass.—James Flanagan has been awarded contract for erecting Ward 5 fire house for $21,000.

Coleraine, Minn.—The Duluth Corrugating & Roofing Co. has been awarded the contract by the School Board for placing two steel fire escapes on the Greenway school and one on the Marble school. Forty-five extinguishers were also ordered from the American La France Fire Engine Co., to be distributed among the various schoolhouses.

Millburn, N. J.—Township Committee, at the suggestion of Daniel P. Kingsford, Chairman of the Fire Committee, accepted the bid of the Eureka Fire Hose Co. of New York, for 1,500 ft. of new hose at a total cost of $1,200.

New Brunswick, N. J.—The contract for the new engine house of Hibernia Engine Co. for $9,200, was awarded to Lewis Board.

Newburgh, N. Y.—The Fire Department Committee of the City Council has let the contract for furnishing 2,000 ft. of hose to the Eureka Fire Hose Co., which is represented by J. B. Quinlan, city. The Eureka Co. bid 90c. a ft. for single jacket hose and the C. C. C. Co., 87c. for double jacket hose.

Providence, R. I.—Following bids on main white hose were received and referred for tabulation as follows: Combination Ladder Co., of this city, 61.4 cents, awarded contract; C. C. C. Fire Hose Co., 75 cents; Cornelius Callahan Co., of Boston, 75 cents; Woven Hose and Rubber Co., 79 cents; N. J. Car Spring Rubber Co., 80 cents; American Supply Co., 80 cents. There were many alternate bids on different qualities.

Houston, Tex.—Bids for new fire station at corner of Sampson st. and Preston ave. were received as follows: J. W. Hine, $8,500; E. D. Harlow, $8,000; W. B. Bowles, $7,448; Winston Construction Co., $7,700; D. D. Pittman $6,664; John Stadtler, $7,761; A. Bering, $8,203; R. L. Drake, $6,889; C. C. Wenzel $7,100; James Shapley & Son, $7,357; C. H. Winn, $7,158.90.

Those who submitted bids for the plumbing work were: Robischung Bros., $932; J. W. Thiel, $1,065; McNeely & Heitmann, $1,100; Modern Plumbing Co., $1,144; Collins Bros., $1,175; Keithly Co., $1,125.

As shown by the bids D. D. Pittman and Robischung Bros. are the lowest bidders.

Tacoma, Wash.—Tacoma will have two more motor propelled vehicles added to its fire fighting equipment when contracts authorized by Council are filled by the Seagrave Co., the successful bidder on an 80-h.p. chemical and combination hose wagon and an 80-h.p. hose wagon; the combination wagon will cost $5,600 and the hose wagon $5,175. Council also ordered two more horse-drawn steam fire engines, authorizing the Commissioner of Public Works to accept the bid of the American La France Co., whose bid amounted to $12,376. The city has already placed an order for an auto chemical engine.

ELECTRIC RAILWAYS

Alameda, Cal.—Southern Pacific Co. has applied for another electric railway franchise in this city; new franchise is to cover a projected line to run easterly on High st. from new electric loop, to and across High st. bridge, affording company an outlet to Fruitvale, San Leandro and Hayward.

Fresno, Cal.—F. S. Granger, promoter of the Fresno-Hanford Interurban Railroad, has announced that construction work will begin Jan. 1 next.

San Bernardino, Cal.—W. W. Poole has asked franchise for electric road across Cedar ave. and other streets toward Rialto; franchise will be sold Jan. 24.

San Francisco, Cal.—Successful effort has been made by Fillmore Street Improvement Club to secure franchise on Gough st., between McAllister and Market sts., for purpose of relieving traffic on Fillmore st. hill. The United Railroads is willing to take over road after it is built.

San José, Cal.—San José Railroad Co. has filed articles of incorporation; it proposes to take over the 1st st. railroad line and operate it in connection with Santa Clara line and to construct other local lines. Men interested are: L. E. Hanchett, President; W. R. Lawson, Manager, and E. M. Rea, Secretary and attorney of the Santa Clara street line, and F. E. Fitzpatrick; capital stock, $5,000,000.

Santa Clara, Cal.—Commercial League is working to secure right of way through lands northwest of the city for extension of street car system north to meet line which is to run south from Palo Alto, and which is ultimately to form a through electric line from San Francisco to San José.

Jacksonville, Fla.—Commissioners have granted Jacksonville Electric Co. 15-year franchise to construct and operate street railway on Lincoln ave.

Live Oak, Fla.—Florida Railway will be extended from this city to Fernandina.

Fitzgerald, Ga.—Council has granted Fitzgerald and Ocilla Street Railway Co. franchise to construct electric line in city.

Idaho Falls, Ida.—Idaho Falls Electric Railroad has been incorporated to build 34-mile electric railway in the vicinity of this city. Capital stock, $1,000,000. J. L. Miller, city, President; A. V. Scott, city, Secretary. H. S. Sewell, New York, N. Y.; F. S. Cleveland and Ray K. Kramer, Pittsburg, Pa., are interested.

Kewanee, Ill.—Promoters of Tampico-Hooppole electric line are contemplating extension from Tampico line south through New Bedford, Manlius and then possibly to Princeton to connect with McKinley interurban line.

Marengo, Ill.—Council has passed ordinance granting Woodstock and Sycamore Traction Co. right to erect poles, lay rails and operate cars upon and along West Main, State and Telegraph sts.

Maple Park, Ill.—Council has granted franchise to Chicago, Aurora & De Kalb Railroad for electric railway through Maple Park; company proposes to build electric railway from Aurora to De Kalb. J. H. Bliss, Sugar Grove, is interested.

Rock Island, Ill.—Letters of incorporation have been issued to city Belt Line; line is to run in 1st ave. east to the city limits; capital stock, $50,000. Directors are: Frederick C. Denkmann, Otto Huber, Thomas J. Medill, Bernard D. Connelly and Hugh E. Curtis.

Kokomo, Ind.—C. C. McFann has filed with Howard County Commissioners petition asking that election be called in Center Township for purpose of voting subsidy of $35,000 for traction line to connect Kokomo with Burlington, in Carroll County, and Young America, in Cass County.

Concordia, Kan.—Commercial Club is interested in proposition of Motor Grand Traction Co. to build line from Belleville to Wichita.

Paris, Ky.—Council has granted franchise to Cynthiana & Paris Railway Co., void, however, if work of construction is not begun within period of two years and if sale or disposition of the franchise is made to other parties.

Abbeville, La.—The Fourth Ward has voted to levy special 4-mill tax for ten years towards assisting in building of Eunice, Lafayette & Abbeville Railroad.

Eveleth, Minn.—E. M. Prindle and W. M. Prindle, Duluth, have applied for a franchise to build electric line between Virginia and this city.

Albany, N. Y.—Hornell & Bath Interurban Railway Co. has been authorized by Public Service Commission to build electric road from Hornell to Bath, 24 miles in length; new road is to pass through the towns of Hornell, Howard, Fremont, Avoca and Bath.

Montgomery, N. Y.—Wallkill Traction Co. is considering extension of line from Goshen to this place.

Hendersonville, N. C.—Laurel Park Street Railway Co. will purchase gasoline motor car for street railway.

Columbus, O.—Extension of Columbus Railway & Light Co.'s car service to Clintonville is contemplated.

Toledo, O.—Toledo, Napoleon & Lima Railway has been incorporated for purpose of constructing electric railway from Toledo to Lima, passing through Lucas, Henry, Defiance, Putnam and Allen counties; capital stock, $100,000. Incorporators: M. M. Dailey, W. D. Bishoff, M. E. Donaldson, N. W. Gillette and T. E. Gillette.

Grant's Pass, Ore.—City has granted J. R. Allen 50-year franchise for electric line.

Marshfield, Ore.—Union Traction & Terminal Co. has been incorporated to build an electric railway in North Bend and Marshfield, also connecting the two cities; capital stock, $100,000. Incorporators: J. M. Blake, G. W. Kaufman and R. O. Graves.

Springfield, Ore.—Council has granted franchise to Portland, Eugene & Eastern Railway to construct electric railway through the city's streets.

Butler, Pa.—Charter has been granted to Pittsburg & Great Lakes Connecting Railroad Co. Company is capitalized at $120,000, to build 12 miles of track, connecting with Pittsburg & Western at Ellwood City and Western Allegheny at a point near Portersville in this county. Incorporators of the road are: J. Rush Snyder, Pittsburg, President; C. J. Boak, G. T. Snyder and Clyde A. Boak, Pittsburg; C. F. Armour, Girard; W. H. Evans, Baltimore; R. G. Boak and C. H. Aikens, New Castle, and P. H. Sechler, city.

Doylestown, Pa.—Council has discussed matter of enacting ordinance permitting Bucks County Railway Co. to run cars to center of town.

Phœnixville, Pa.—Phœnixville, Valley Forge & Stafford Street Railway has been chartered to construct electric railway from Phœnixville to Stafford via Valley Forge, distance 10 miles; capital stock, $60,000. Incorporators: Thomas E. O'Connell, West Chester, President; O. E. Thomson, John A. Dusmant, C. F. Boden, S. W. Deninger, A. W. Kley, H. H. Gilkyson, E. C. Meir and S. E. Miller.

Chattanooga, Tenn.—Nashville & Adairsville Railway Co., which recently took out a charter to construct electric railway from Nashville to Adairsville, Ky., will increase its capital to $1,250,000; proposed route will be practically an air line from Nashville to Adairsville.

Wichita Falls, Tex.—Wichita Falls &

Northwestern Railway Co. is considering 65-mile extension.

Hoquiam, Wash.—Grays Harbor Interurban Co. has been incorporated for purpose of building electric railway from Hoquiam to Tacoma, via Olympia; capital stock, $500,000. Incorporators: R. F. Lytle, A. L. Paine and E. O. McGlauflin, all of Hoquiam; W. H. Abel and Eldredge Wheeler, Montesano; A. M. Abel and P. S. Locke, Aberdeen.

Brantford, Ont., Can.—T. R. Varding, Buffalo, N. Y., has applied to Council for franchise for electric railway within township.

Montreal, Que., Can.—St. Louis Council has granted privileges to the Montreal Street Railway to build new lines and operate cars on number of streets. Address Manager McDonald.

Sherbrooke, Que., Can.—Council has approved a by-law granting Sherbrooke Street Railway a 40-year franchise.

BRIDGES

Little Rock, Ark.—Property owners of 18th st. are considering construction of viaduct over High st.

Los Angeles, Cal.—Council is considering ordinance providing for construction of bridge across Arroyo Seco at ave. 52; cost, $1,500.—Homer Hamlin, City Engineer.

Marysville, Cal.—Estimates are being made of the cost for constructing a foot bridge over Ellis Lake.

Napa, Cal.—Board of Supervisors has decided to erect stone bridge over Dry Creek.

Pasadena, Cal.—Estimate will soon be completed for high bridge across Arroyo Seco at West Colorado st. Wm. F. Knight, Chairman Board of Trade Committee, is interested.

Sacramento, Cal.—County Surveyor C. M. Phinney has submitted report to Board of Supervisors on question of Yolo-Sacramento County bridge, showing that span will cost upwards of $160,000 and possibly close to $170,000.

Trinidad, Col.—Council has decided to reconstruct bridges at West Main st. and Linden ave. at once.

Jupiter, Fla.—Palm Beach County Commissioners are considering construction of bridge across Loxahatchee River in connection with building of roads.

Twin Falls, Ida.—City will construct bridge across lateral at 2d st. and 8th ave. North.

Elkhart, Ind.—County Council has appropriated $9,365 for bridges.

Hutchinson, Kan.—City Commission has decided to advertise for bids for erecting 50-ft. single arch bridge over Cow Creek on Main st. City Engineer G. L. McLane will submit plans. Commissioners, by their decision, have fixed policy of replacing 12 or 15 wooden bridges now spanning creek with permanent bridges when renewal is required.

Manhattan, Kan.—Union Pacific Railway Co. is considering construction of steel bridge over Blue River cut-off channel.

New Orleans, La.—City Engineer Hardee is considering plans for removal of existing bridge over New Basin at Carrollton ave. and substitute therefor subway for traffic of street cars, vehicles and pedestrians.

Shreveport, La.—Mayor S. A. Dickson has been advised that Government Engineer Capt. C. S. Smith, of Vicksburg, Miss., has approved the plans for free wagon bridge across Red River, connecting Shreveport and Bossier City, to cost between $200,000 and $300,000.

Rising Sun, Md.—State Roads Commission is considering construction of bridge, two 36-ft. spans, reinforced concrete.—Walter W. Crosby, Johns Hopkins University, Baltimore, Chief Engineer.

Holyoke, Mass.—Money for new bridge over first level canal on Cabot st. will be asked by Board of Public Works the coming year.

Marinette, Mich.—Construction of bridge over river at this place is being considered.

Duluth, Minn.—Board of Public Works has authorized bids advertised for enlarging bridge over Mission Creek Canal at Fond Du Lac.

Greenwood, Miss.—Le Flore County Commissioners will issue $100,000 bonds for construction of bridges.

Kansas City, Mo.—Missouri Pacific Railway will construct bridge across Kaw River.—J. W. Way, St. Louis, Consulting Engineer.

Caledonia, N. Y.—Plans have been prepared for construction of 150-ft steel bridge for Caledonia and Avon; structure will cost $10,000.

Hulberton, N. Y.—Citizens are urging construction of lift bridge over Barge Canal at this place.

Niagara Falls, N. Y.—The Grade Crossing Commission has approved plans and specifications for rebuilding the 11th st. bridge over New York Central Railroad tracks at the North End; cost, $75,000.

Dayton, O.—County Commissioners have accepted plans of Big Four Railway for overhead crossing of Franklin pike near Miamisburg.

Norwalk, O.—Bonds of $10,000 will be issued by the County Commissioners for construction of proposed bridge over Huron River.—O. J. E. Smith, County Auditor.

Toledo, O.—Contract for lift draw in Cherry st. bridge will be let in near future.

Youngstown, O.—Erection of overhead bridge at Holmes st. crossing of Erie Railroad is being considered.

Woodsfield, O.—County Commissioners are considering construction of bridge over Fish Pot Run.

Portland, Ore.—O. R. & N. Railroad will soon receive bids for erection of $1,300,000 bridge at foot of Oregon st.

Stayton, Ore.—Marion County is considering replacing of bridge washed out by flood.

Dover, Pa.—Council is considering construction of bridge over Fox Run at South Main st.

Pittsburg, Pa.—Council is considering ordinance asking Finance Committee to place $20,000 as next year's appropriation for bridge in line with Harwood st.

Washington, Pa.—Greene and Washington County Commissioners are considering construction of bridge over a branch of Wheeling Creek, from West Finley Township in Washington County, to Acleys in Greene County.

Mitchell, S. D.—Commercial Clubs of cities west of the Missouri River are urging construction of bridge across river at Chamberlain.

Dallas, Tex.—Dallas County Commissioners have approved specifications for proposed $90,000 bridge at Miller's Ferry.

Dallas, Tex.—County has sold $175,000 bridge and $600,000 viaduct bonds to City National Bank.

San Antonio, Tex.—San Antonio & Aransas Pass Railway will construct steel bridge across Colorado River; cost about $70,000.—J. S. Peter, General Manager.

Petersburg, Va.—W. G. David, 511 Board of Trade Building, Norfolk, Va., desires designs for 800 ft. reinforced concrete bridge.

Roanoke, Va.—Wasena Land Co. will construct two steel bridges across Roanoke River.—P. S. Miller, President.

Bellingham, Wash.—County Commissioners have decided to replace bridge at Marietta.

St. John, N. B., Can.—Council will consider construction of bridge across harbor at cost of $750,000.

Seattle, Wash.—All bids have been rejected by Board of Public Works for construction of bridge over Duwamish River.

Tacoma, Wash.—Council is considering ordinance for construction of wooden bridge over gulch on Franklin st.

BIDS RECEIVED AND CONTRACTS AWARDED

Chicago, Ill.—Commissioner of Public Works John J. Hanberg has let a contract to the Roemheld Construction Co. for the repairing of the Madison st. bridge for $25,573; the contract provides a penalty of $100 for each day over the 30 required for the work, and a bonus for a like amount for each day intervening before the contract period and the completion of the work.

Missoula, Mont.—The County Commissioners have awarded contracts for construction of two bridges over the Blackfoot River to O. E. Peppard, one three miles above Bonner and the other six miles above Bonner. The structures are to be of the combination type, of wood and steel, and are to cost $6,000 each; in addition, $5.45 per lin. ft. is to be allowed for the necessary approaches.

Wayne, Neb.—Standard Construction Co., of Omaha, has been awarded contract by the County Commissioners for constructing and repairing all county bridges for the year 1910; bids were opened Dec. 21.—Charles W. Reynolds, County Clerk.

New York, N. Y.—Lafferty & Weir, 723 Lexington Ave., city, have been awarded contract by J. W. Stevenson, Commissioner of Bridges, for construction of steel and timber trestle at Kent ave. bridge, over Bushwick creek, Brooklyn; bids were opened Dec. 14.

Toledo, O.—There is every indication that the Pneumatic Caisson Co., of Troy, N. Y., will be awarded the contract for building the new Cherry st. bridge at $777,777. This company agrees to complete its portion of the contract two years and three months from the time of its signing.

Oklahoma City, Okla.—Oklahoma County Commissioners have awarded contract to Kansas City Bridge Co., Kansas City, Mo., for construction of 34 one-beam bridges.

Beesville, Tex.—County has awarded contract to Ottumwa Bridge Co., E. P. Alsbury & Sons, Agts., Houston, for construction of a steel bridge over Aransas Creek; bids were opened Dec. 16.—Dan Troy, County Clerk.

MISCELLANEOUS

San Francisco, Cal.—Board of Supervisors has appropriated $100,000 for use of Board of Health in purchasing permanent equipment of city and county hospital.

Hartford, Conn.—Council has appropriated $2,466.96 for street sprinkling.

New Haven, Conn.—Board of Health has voted to advertise for bids for garbage collection for next year.

Wilmington, Del.—Directors of Street and Sewer Department have decided to purchase four snow plows.

Washington, D. C.—Major Sylvester, Superintendent of Police, has recommended purchase of automobile for use of Central Office detectives, motor patrols, erection of new stations in different parts of city, building for Harbor Precinct and new station for First Precinct.

Pensacola, Fla.—County Commissioners have decided to reject all bids for construction of jail after plans by Benz Bros., architects.

Atlanta, Ga.—Police Department will ask for $313,080 for maintenance and improvements; two automobile patrol wagons, two new substations, extension of police signal system and installation of six signal boxes is desired.

Peoria, Ill.—Proposed Carnegie Library will be erected in Lincoln Park.

Waukegan, Ill.—Citizens have voted $30,000 municipal improvement bonds.

Columbus, Ind.—Pennsylvania Railroad has granted application of Council for lease on railroad square property, east of city hall, for park purposes.

Indianapolis, Ind.—Codicil to will of George Rhodius leaves residue of his estate, or about $500,000 to be applied to improvement of parks in city.

Indianapolis, Ind.—Recent bids received for construction of public comfort station at Kentucky ave. and Illinois st. has been rejected by Board of Public Works; lowest bid, including architects' fees, amounted to about $2,500 more than the appropriation of $20,000 allowed by Council for work.

Michigan City, Ind.—Council has passed resolution giving Board of Public Works permission to build docks along west side of harbor.

Baltimore, Md.—Architects Ellicott and Emmort, Union Trust Bldg., have prepared plans for erection of $25,000 library.

Boston, Mass.—Fifth Pier, eventually to be 800 ft. long, will be constructed at East Boston by Boston & Albany Railroad if approval of Harbor and Land Commissioners can be secured.

Boston, Mass.—Board of Aldermen has voted to allow transfer of $40,000 from lamp division to appropriation for repair of ferry boat Gen. Sumner.

Boston, Mass.—Board of Aldermen has voted to appropriate $60,000 of income of Parkman fund for subsoil irrigation for Boston Common.

Boston, Mass.—Plans have been prepared for erection of proposed East Boston court house and police building in Central Square Park.

Fall River, Mass.—Board of Park Commissioners will purchase site at Eastern ave. and Main st. for playground.

Haverhill, Mass.—Erection of police station is being considered; present station has been condemned both for its condition and for inadequateness.—Alderman J. W. Bean, President, Department of Safety and Charity.

Haverhill, Mass.—Council is considering purchase of playground site for Wards 3 and 6.

Leominster, Mass.—Rebuilding of town hall, destroyed by fire, is being considered.

Malden, Mass.—Committee of Tubercular Investigation has recommended $15,000 appropriation for building tuberculosis camp.—C. M. Blodgett, Chairman.

New Bedford, Mass.—City has awarded $100,000 public library bonds to New Bedford Institution for Savings.

Newton, Mass.—Board of Aldermen has approved movement to have Charles River dredged from Watertown Dam to Newton Lower Falls.

Taunton, Mass.—Chief of Police Fish has asked city to purchase automobile for use of department.

Atlantic City, N. J.—Frank Brown has made proposition to Council to erect combination public comfort station, bathing establishment and boardwalk stores at Texas ave.

Montclair, N. J.—Installation of garbage disposal plant is being considered; cost $50,000.

Newark, N. J.—Finance Committee has recommended erection of police station.

Newark, N. J.—Council has granted $7,500 appropriation for cleaning streets.

New Brunswick, N. J.—Council has decided to purchase Woodbridge property for park purposes.

New York, N. Y.—Architects Babb, Cook & Welsh, 3 West 27th st., have filed plans for erection of $40,000 granite and brick monument on Independence ave. for city.

Niagara Falls, N. Y.—Board of Estimate has directed City Clerk to advertise for bids on bonds for raising of $60,000 needed for purchase of Trott property, Main st.

Cincinnati, O.—Surveyor Cowen has estimated cost of protecting fair grounds at Carthage from inroads by Mill Creek waters at $17,650 for concrete wall to take place of the worn-out piling.

Altus, Okla.—Jackson County will vote Feb. 26 on $100,000 bonds for erection of jail and court house.

Claremore, Okla.—Citizens will soon vote on $15,500 bonds for city park building and site and $10,000 for parks.

Oklahoma City, Okla.—City is considering disposal of garbage.—Address Mayor Scales.

Portland, Ore.—Mayor Simon and Park Board have decided to set aside number of plots and equip them with apparatus for children.

Salem, Ore.—Installation of incinerating plant is being considered.

Tillamook, Ore.—Robert G. Stillwell has deeded city 4½ acres of land for playground purposes.

Gettysburg, Pa.—Engineers are making survey for map of land intended for park to be known as Broadway Park.

Pittsburg, Pa.—Mayor W. A. Magee has approved plan originated by Director Joseph G. Armstrong, of Public Works Department, to tear down burned market house and old city hall across street and replace both with new building, with arcade over Market st. and a large assembly hall on top floor.

Greenville, S. C.—City has not yet let contract for erection of proposed $5,900 building; plans by Fred G. Rogers.

Waco, Tex.—City Commission has decided to submit proposition for bond issue of $35,000 for parks.

Kennewick, Wash.—Erection of city hall is being considered.

Seattle, Wash.—On recommendation of Francis W. Grant, Superintendent of Public Buildings, Finance Committee has decided to incorporate additional $10,000 for police substation at 3d ave. and Pine st. in bond issue which will be submitted to the voters at next election.

Seattle, Wash.—Chief of Police Irving Ward has recommended establishment of four police stations with captain in charge of each.

Milwaukee, Wis.—Isham Randolph, City Consulting Engineer of a project for municipal docks, will soon report project for expenditure of $6,000,000 for conversion of Jones Island, at river mouth, into slips, municipal docks and warehouses. Government will pay $2,000,000 of the amount necessary. Project includes extensive railway terminal system to proposed docks, these terminals to be owned and operated by city.

BIDS RECEIVED AND CONTRACTS AWARDED

Indianapolis, Ind.—Contracts for finishing the city hall building probably will be below the estimate of Rubush & Hunter, Architects. Bids were opened by the Board of Public Works on the interior decorating work, hardware, vacuum cleaning system, elevators and mail chute. For the interior decorative work, which the architects estimated would cost $22,000, the bids submitted were as follows: William Koch & Co., $18,825; Louis J. Millet, Chicago, $19,800; Albert Gail Co., $21,232.50; Brand & Ranje, $22,000, and William Frederick Behrens, of New York City, $23,700. Mr. Behrens accompanied his bid with a letter saying that his bids on the numerous panels were for mural paintings representing scenes of early life in Indiana. The estimate for two freight elevators and one freight lift was $13,500, the bids being: Otis Elevator Co., $9,500; D. V. Reedy Elevator Co., $11,928. The Board decided to let the contract to the Otis Elevator Co. Lilly & Stalnaker and the Vonnegut Hardware Co., local concerns, were the only bidders for the hardware contract, their figures being $9,825 and $10,480, respectively; the architect's estimate for the hardware was $5,000. Only one bid was submitted on the mail chute, which had been estimated at $1,900, this bid being from the Cutler Mail Chute Co., of Rochester, N. Y., and was $1,265. There were three bids for the vacuum cleaning system, as follows: R. W. Koch, Cincinnati, representing the Spencer Turbine Cleaner Co., of Hartford, Conn., $1,500; American Air Cleaning Co., Milwaukee, Wis., $1,442.75, and the Connersville Blower Co., Connersville, $1,150. The Board and Mayor said they did not expect to be guided entirely by the lowest bids submitted in awarding contracts unless the lowest bids were satisfactory from the standpoint of art and quality.

Indianapolis, Ind.—The Board of Public Works received the following bids for the construction of public comfort station: J. T. Elliott, $17,697; J. L. Galbreath & Co., $19,440, and W. A. Halstead & Co., $18,700. Plumbing bids were: M. J. McCarthy, $3,736; Hayes Bros., $3,987; J. A. Diggle, $3,946; George W. Keysey & Co., $4,323, and Kikoff Bros., $5,096.

Vincennes, Ind.—The Board of Works opened two bids for the removal of the historic Harrison house from its present location to a point in Harrison Park in order to preserve it, one from Crowe Bros., of Chicago, for $3,500, completed; and the other from J. F. Hines, of St. Louis, for $3,350, completed.

New Orleans, La.—Bidders for erection of public bath in St. Mary, near Religious, were as follows: Arthur Liebe, $14,877, and Michel Chesse & Co., $10,740.

East Orange, N. J.—Michael Loprete will be scavenger to the end of the term of his original contract, which was for five years. His was the lower of two bids received by the City Council Dec. 27 for the period between Feb. 1 next and Aug. 10, 1911, and he will get for the work $28,125, instead of $20,100, as he would have done under the old contract, but he must provide extra means for the collection and disposal of waste papers, which lately have become an intolerable nuisance and constituted the reason for advertising anew for the work. Frank A. Moloney, of Orange, was the other bidder, his price exceeding Loprete's by $187.50. An effort was made several months ago to get around the problem by making a supplementary contract with Loprete. City Attorney Gedney, however, ruled that illegal, and the new contract was resorted to. Had the original plan been possible the city would have been the loser by just $225, for everything was arranged at that time to give Loprete $18,900 a year for the work, or a total of $28,350.

Jersey City, N. J.—The following bids were received by the Board of Finance Dec. 17 for additions to the heating plant at the Free Public Bath, 14th and Erie sts., and contract awarded Dec. 24 to John H. Cooney, 210-212 N. 4th st., Harrison, N. J., he being the lowest bidder: John H. Cooney, $520; Barclay & Fielding, 314 Pacific ave., Jersey City, $622.50; Wm. J. Murphy, 140 Pavonia ave., Jersey City, $675; John T. McLaughlin, cor. York and Greene sts., Jersey City, $844.—R. J. Vreeland, Clerk.

Perth Amboy, N. J.—Woglom & Bujnovsky have been awarded contract to complete stable in rear of city hall in accordance with plan and specification as prepared by J. K. Jensen for $809, the lowest bid of nine submitted.

Albany, N. Y.—The Superintendent of Public Works, F. C. Stevens, Dec. 29 received bids on four additional barge canal contracts as follows: Contract 33, for constructing lock gates, needle beams, guard and sluice gates at various points on the new canal; Contract 44, for constructing a little over seven miles of canal just west of Rome; Contract 70, for dredging the channel of the Hudson River from Waterford northerly, a distance of 3½ miles, and contract 71, for constructing dam No. 1, above Waterford, and dredging a distance of upwards of four miles. Shanley-Morrissey, of New York City, were the low bidders on both Contract 70 and 71. When these two contracts have been awarded all of the dredging and excavation work for the Champlain Canal will have been placed under contract.

New York, N. Y.—Supreme Court has denied W. J. Schieffin's application for a permanent injunction restraining Board of Estimate and Bridge Commission from letting contract for the new municipal building; contract was let to Thompson-Starett Co., lowest bidder; company offered to put up the building for about $5,000,000.

Philadelphia, Pa.—Eight band leaders sought the contract for supplying concerts in public squares during the summer months by the organization known as the Municipal Band. A. Frank Bergey had the contract this year for $13,664. He bid the same figures. Others who submitted bids to Director Clay are: Benjamin Roeschman, $13,700; W. R. Herbert, $13,602; A. Luck, $14,000; S. R. Hummel, $13,762; Adolph Horchberg, $13,660; Owen J. Burness, $13,662; Henry Klotz, $12,900. No award will be made until after January 1.

Other bids received were for hardware, lumber, paints, oils, carpet, rugs, etc., required for the year 1910 for the bureaus under the direction of the Department of Public Safety. The total cost of these will be $100,000. The bids were so numerous that only the names of bidders were read.

TOO LATE FOR CLASSIFICATION

STREET IMPROVEMENTS

Montgomery, Ala.—City will soon receive bids for nine separate contracts for paving as follows: Street pavement, 31,235 sq. yds.; curb, 15,050 lin. ft.; gutters, 10,100 lin. ft.; reset curb, 1,735 lin. ft.; granite header stone, 710 lin. ft.; sidewalk paving, 64,000 sq. ft.; storm sewer pipe, 15-in., 3,085 ft., 18-in., 200 ft., 24-in., 575 ft., 12-in., 50 ft., 6-in., 500 ft.; inlets, 45; catch basins, 8; brick in walls, 65 M; steps, 47; brick driveways, 265 sq. yds.

Monrovia, Cal.—Trustees have authorized paving and curbing of Heliotrope ave.—L. E. Hotchkiss, City Clerk.

Red Bluff, Cal.—City has adopted ordinance compelling property owners to lay cement sidewalks.

Santa Ana, Cal.—Board of City Trustees has decided to pave and curb portions of Harmonia, Claudina and Center sts.; cost about $40,000.

San Diego, Cal.—City Trustees will soon let contract for improving 4th st.; cost $22,000.—E. M. Capps, City Engineer.

East St. Louis, Ill.—Bids will be received about Feb. 1 for brick paving on Wavery and Belmont aves.; cost, $81,400.—W. J. Crocken, City Engineer.

Upper Alton, Ill.—Contract will soon be let for paving; cost about $40,000.

Hutchinson, Kan.—Bids will be received Jan. 18, 3 p. m., for construction of 2,650 sq. yd. brick paving on Adams st.; also for 1,320 lin. ft. curb and gutter, and 96 ft. curb in same district.—Ed. Metz, City Clerk.

Kansas City, Kan.—Bids will be received by Wyandotte County Board of Commissioners about Feb. 15 for macadamizing and grading Sherman rd.—J. M. Lindsey, County Engineer.

Olathe, Kan.—Johnson County Board of Commissioners received no bids for construction of J. R. Thorpe rd.; distance 1½ miles.—Robert Baker, Chairman.

Baltimore, Md.—City Engineer Fendall will recommend purchase of 500,000 vit. brick to be used for short patches of paving and for crossings.

Detroit, Mich.—Citizens of Bedford Township have voted to issue $50,000 bonds for improving Grand River and Plymouth Roads.

Albany, N. Y.—Supervisor Walker has offered resolution authorizing construction of State road under provisions of the highway law in village of Altamont, connecting end of county road No. 177 to continue through Main st. to end of road No. 575 on Prospect ave.

Akron, O.—County Commissioners are considering paving of South Main st. extension.

Hamilton, O.—Union Savings Bank & Trust Co., Cincinnati, wil be awarded $25,000 street improvement bonds.

Wilkes-Barre, Pa.—Council has passed ordinance appropriating $1,500 for use of Street Committee.

Galveston, Tex.—Bids will be received Jan. 10, noon, for improving road from Lakeview cemetery to 57th st. and county road.—J. M. Murch, County Auditor.

Waco, Tex.—Campaign in behalf of good sidewalks has been started.

Tacoma, Wash.—County Commissioners are considering issuance of $500,000 bonds for following improvements: Complete road to Thurston county line, $100,000; complete road to King county line, $100,000; macadamizing Mt. Tacoma Canyon road, $130,000; present road and bridge fund deficit, $120,000, and improving city main suburban thoroughfares, $50,000.

Stoughton, Wis.—City Engineer J. T. Hard, is completing plans for sewer system; cost $80,000.

BIDS RECEIVED.

Jacksonville, Fla.—The Pennsylvania Engineering Co. has been awarded contract for constructing 2¼-mile brick roadway, 15 ft. wide, on sand foundation, for $1.54 per sq. yd.; also 23,760 lin. ft. new curb at 18c. per foot.—Gail F. Barnard, County Engineer.

SEWERAGE

Lexington, Ky.—Proposed bond issue bill, which Mayor Skain is having prepared by City Attorney J. Embry Allen, will contain a provision of $100,000 for sewer construction in addition to $500,000 for new streets.

Plainfield, N. J.—Mayor N. B. Smalley is urging extension of borough limits so

as to include proposed site for sewage disposal plant.

Trenton, N. J.—Council has decided to construct sewer on Fair st.—H. B. Salter, City Clerk.

Laurinburg, N. C.—City will extend its sewers about 1,200 ft. and water mains 1,000 ft.—M. L. John, Mayor; F. F. Wetmore, Lumberton, Engineer.

Cincinnati, O.—County Commissioners are considering construction of a trunk sewer in Millcreek from Glendale to Ohio River.

CONTRACTS AWARDED.

Syracuse, N. Y.—Board of Contract and Supply has awarded contract for laying 18-in. pipe sewer in George st. and 15-in. pipe sewer in Paul ave. James Swift was low and successful bidder at $1,475.21.

Baltimore, O.—Irwin Bros., Hamilton, has contract at $61,705 for the construction of a sewer in this city.

WATER SUPPLY

Quincy, Ill.—Bids will be called for in January for high duty pump of 6,000,000 gal. capacity in 24 hours.—Daniel W. Mead, Madison, Wis., Consulting Engineer; W. R. Gelston, Superintendent, Citizens' Water Co.

Wichita, Kan.—City Commissioners have instructed city attorney to proceed with preparation of a contract providing for purchase of city water works plant; contract price is $1,100,000; proposition to issue bonds will be submitted to voters of city.

Wilson, Kan.—City is considering construction of water works; cost about $45,000.—A. E. O'Donnell, Mayor; N. Coover, City Clerk.

Elkton, Md.—Town Council will issue bonds during year for installation of water works.

Ipswich, Mass.—Citizens have voted to extend water system to Candlewood.

Chouteau, Mont.—Carl Tschepen, Havre, has secured franchise from County Commissioners for water works.

Keesville, N. Y.—City is considering construction of water system; cost $20,000.—W. G. Stone, Utica, Engineer.

New York, N. Y.—Bids will be received Jan. 12, 2 p. m., for furnishing, delivering and laying water mains in about 25 streets.—H. S. Thompson, Commissioner of Water Supply, Gas and Electricity.

Wakonda, S. D.—Citizens have voted to construct water works; engineer not yet selected.—W. O. Knight, Town Clerk.

Vernal, Utah.—Gray & Grash, Salt Lake City, are preparing plans for water works; cost about $12,000.—B. P. Kelly, City Recorder.

LIGHTING AND POWER

Palo Alto, Cal.—City Engineer Byxbee and City Electrician Youens have completed plans for street lighting system; bids will soon be asked.

Bridgeport, Conn.—Aldermanic Lamp Committee has asked for total of $68,100.27 for both electric and gasoline lighting, which includes $2,000 for new lights.

Statesboro, Ga.—Engine and dynamo will be installed at municipal electric light plant.—H. B. Davis, Superintendent.

Fort Wayne, Ind.—Council has passed ordinance appropriating $50,000 to electric lighting department.

Elkton, Md.—Town Council will issue bonds during year for erection of lighting plant.

Sylvan Beach, N. Y.—Village will use gasoline engine to furnish power for the proposed electric light plant; village will build the plant instead of letting it by contract.—Dr. M. Cavana, President Board of Village Trustees.

Niles, O.—The Hydro-Electric & Gas Co., Warren, has decided to erect auxiliary plant near present municipal works to provide additional current.

Aberdeen, S. D.—Gilborne Bros. have petitioned for franchise for lighting and heating plant.

Granite Falls, Wash.—Granite Falls Electric Co. has petitioned County Commissioners for franchise to construct transmission line, and also pipe line for water, in Snohomish County.

CONTRACT AWARDED.

Elmira, N. Y.—Town Board has made contract with Elmira Water, Light and Railroad Co. to place 7 60-candle-power lamps.

FIRE EQUIPMENT

Palo Alto, Cal.—City Engineer Byxbee and City Electrician Youens have completed plans for fire alarm and street lighting system, which will effectively cover city; advertisements for bids will be published very soon.

Trenton, N. J.—Board of Fire Commissioners have decided to purchase another auto engine and form new company.—C. S. Allen, Chief.

Hamilton, O.—Union Savings Bank & Trust Co., Cincinnati, will be awarded $10,000 Fire Department bonds.

Harrisburg, Pa.—Fire Chief Garverich has asked for $50,000 appropriation for maintenance and extension of fire department.

York, Pa.—Fire Department has recommended need for additional service and chemical hose.

CONTRACT AWARDED.

Lenox, Mass.—Special Committee on fire protection has voted to buy American-La France automobile fire truck for Lenox fire department; truck will cost about $5,000 and will have 60-horse-power motors and capacity for 8 men beside necessary chemical engine outfit.

ELECTRIC RAILWAYS

Los Angeles, Cal.—Los Angeles Railway Co. will build about 80 miles of new track.—H. E. Huntington, General Manager.

San Francisco, Cal.—Citizens have voted $2,000,000 bonds to reconstruct Geary st. railway line and operate it under supervision of city.

New London, Conn.—New London & East Lyme Street Railway Co. will build about 10 miles of new track during year.—L. S. Rudd, Superintendent.

Tallulah Falls, Ga.—Louis Magid, Tallulah Falls, is interested in project to establish four-mile electric railway.

Schafer, N. D.—Hudson Center and New Salem Electric line will be formed to parallel at some distance extension Northern Pacific is building north from Mandan. It is planned to build a large power house to Centre. Another prospective line is planned to extend from Mandan to Manning in Dunn County.

Charlotte, N. C.—Engineers for Atlantic Coast Line Railway have begun work on two surveys from points on that system to Charlotte with object of building line into this city; two points are Wadesboro, 44 miles distant, and Hartville, S. C., distance of about 80 miles.

Ardmore, Okla.—Arbuckle & Western Railroad Co. has been organized to build a railway, to be operated by steam and electricity, from Ardmore to Chickasha and Comanche. Oscar Ayres, Ardmore, is interested.

Johnstown, Pa.—Company of local men will organize company, capital $500,000, to lease local car lines; $200,000 will be spent in improvements. Following are interested: Attorney Percy Allen Rose, John H. Waters, James P. and William R. Thomas, Charles S. Price, Cambria Steel Co., and H. H. Weaver, General Manager of Citizens' Light, Heat & Power Co.

Scranton, Pa.—Scranton Railway Co. will construct during year about five miles of new track.—A. S. Kibbe, Philadelphia, Chief Engineer.

Stroudsburg, Pa.—William R. Kelly, Chief Burgess of Delaware Water Gap, has vetoed ordinance passed by Council granting franchise to Stroudsburg & Delaware Water Gap Street Railway Company to extend its line to point of Gap, making through trolley service to Philadelphia.

Memphis, Tenn.—Clarksdale, Covington & Interurban Railroad Co., a subsidiary of Lakeview Traction Co., which proposes to build electric line from Clarksdale, Miss., via Memphis, to Collierville and Covington, has filed amendment to its charter whereby it seeks to secure privilege of building four lines in Memphis proper, two running east and west and two north and south.

BRIDGES

Omaha, Neb.—Council has approved plans for viaduct over tracks of Great Western, near Mason st.

Nashua, N. H.—Sub-committee on plans for erection of proposed Merrimack bridge has recommended that bridge be 28 ft. wide; plans are being prepared.—A. W. Dean, Chairman.

Chetek, Wis.—Town Board has adopted plans of State Bridge Engineer for Narrows bridge; cost about $12,000.

Milwaukee, Wis.—Council has decided to call election on $150,000 bonds for constructing bridge to connect 13th and 18th Wards.

MISCELLANEOUS

Livermore, Cal.—Residents have voted $10,000 bonds for purchase of block at First and Main sts. for public park.

Montrose, Col.—Mayor J. Q. Allen requested that Congressman Edward Taylor endeavor to have Government donate Flat Top mountain and lands surrounding it for a city park.

Bridgeport, Conn.—Building Department has asked for automobile for Inspector Rowland.

Bridgeport, Conn. — Superintendent of Streets John H. Colgan has filed with City Auditor requisition upon Board of Apportionment for $61,968.50, for use of his department during next fiscal year; he estimates cost of cleaning permanent pavement at $32,310.50; and for special appropriation of $1,000 for machine to flush permanently paved streets.

Wilmington, Del.—Public Building Committee of Council has approved plans for proposed improvements to prisoners' quarters at police station which were prepared by Engineer Taylor, of Street and Sewer Department, and Plumbing Inspector Edward F. Kane.

Evansville, Ind.—North Side people are circulating petitions to have city buy Garvin Park.

Leavenworth, Kan.—City Commissioners have sold $29,144.11 general and special improvement bonds.

Omaha, Neb.—City Engineer Craig has recommended purchase of automobile for use of Council Committee and himself.

Omaha, Neb.—Council will soon receive bids for garbage gathering in eight districts into which city will be divided for one year.

New York, N. Y.—Bids will be received by Department of Docks and Ferries, Jan. 7, noon, for repairing municipal ferry boats or other floating ferry property.—Calvin Tompkins, Commissioner.

Paterson, N. J.—Mrs. Jane C. Wrigley, widow of the late Thomas Wrigley, has tendered to city, without cost, thirty-six lots on Graham ave. and Lafayette st. for establishment of public park, only consideration being that tablet be erected by citizens of this city as memorial to her late husband.

Toledo, O.—Council has adopted resolution declaring its intention to purchase Peter tract on South Erie st., to be used as market.

Erie, Pa.—Appointment of a Special Committee of Councils to investigate plans for better system of garbage collection throughout city has been approved by Mayor Liebel.

Wilkes-Barre, Pa.—Public Property Committee has recommended that bids be readvertised for station house.

CONTRACTS AWARDED.

Albany, N. Y.—F. C. Stevens, State Superintendent of Public Works, has announced award of barge canal Contract 71 to Shanley-Morrissey, Inc., of New York, for $1,516,119, based on engineers' estimate of quantities; contract calls for dredging of about 4 miles in Hudson River above Waterford.

New York, N. Y.—Bids were received as follows by the Department of Street Cleaning, Dec. 31, for snow removal in the boroughs of Manhattan, Brooklyn and the Bronx. They will be passed upon by the Board of Estimate and Apportionment, which will probably award contract within the next week or two.

Form No. 1 is the area system, by which the contractor is paid for 33 1-3 per cent of the snowfall by area measurement, according to the official report of the U. S. Weather Bureau, there being a shrinkage clause of 66 2-3 per cent.

Form No. 2 provides for payment according to the actual amount dumped at the docks at so much per load, as checked by the inspector at the loading and the dump foreman.

Bids compared thus: No. 1, 3 × piling + removal. No. 2, 3 × removal + piling.

BOROUGH OF MANHATTAN.

Form No. 1:	Removal.	Piling.	Total to Compare.
T. Crimmins Contr Co..	$.66	$.18	$1.30
Wm. Bradley	.46½	.00½	*.48
W. J. Fitzgerald.....	.60	.10	.90
Canavan Bros. Co.....	.60	.14	1.02
Form No. 2:			
Wm. Bradley	.48	.00	*.144
W. J. Fitzgerald.....	.58	.08	1.82
Canavan Bros. Co....	.72	.14	2.30

BOROUGH OF THE BRONX.

Form No. 1:			
Chas. Schneider.....	.33	.08	.57
Wm. Bradley	.45	.00	*.45
C. deMarco	.30	.12	.66
P. J. Kane Contr. Co..	.65	.45	2.00
Form No. 2:			
Chas. Schneider.....	.27	.03	*.89
Wm. Bradley	.40	..	1.20(?)
C. deMarco	.43	.12	1.41
P. J. Kane Contr. Co..	.65	.45	2.40

BOROUGH OF BROOKLYN.

Form No. 1:			
Donlon Contr. Co.....	.46	.05	.61
Wm. Bradley	.45	..	.45
Norton & Gorman.....	.18	.09	.45
Newman & Holmes....	.39	..	*.39
Form No. 2:			
Wm. Bradley	.44	..	1.32(?)
Norton & Gorman....	.33	.15	*1.14
Newman & Holmes....	.37½	.10	1.22½
C. de Marco.....	.45	.10	1.45

*Low.